# REMEDIAL DESIGN PLAN

for the

# Industrial Excess Landfill (IEL) Site

**September 22, 2003**

## Submitted by: The Responding Companies


BRIDGESTONE/FIRESTONE, INC.
THE GOODYEAR TIRE & RUBBER COMPANY
THE B.F. GOODRICH COMPANY
GENCORP

# REMEDIAL DESIGN PLAN

# for the

# Industrial Excess Landfill (IEL) Site
# Uniontown, Ohio

# September 22, 2003

**Submitted on behalf of**
**The Responding Companies:**
**The Goodyear Tire & Rubber Company**
**Bridgestone/Firestone, Inc.**
**BFGoodrich Company**
**GenCorp**

**Prepared by:**
**Sharp and Associates, Inc.**
**982 Crupper Avenue**
**Columbus, Ohio 43229**

SHARP AND ASSOCIATES, INC.
Environmental Engineers, Scientists, & Constructors

# EXECUTIVE SUMMARY

**REMEDIAL DESIGN PLAN for the Industrial Excess Landfill (IEL) Site**

# EXECUTIVE SUMMARY

## REMEDIAL DESIGN PLAN STRATEGY

This remedial design plan for the IEL Site has been developed to meet the requirements detailed in the *Statement of Work for the Remedial Design at Industrial Excess Landfill, Stark County, Uniontown, Ohio,* (SOW) as issued by USEPA in association with the *Unilateral Administrative Order for Remedial Design at the Industrial Excess Landfill Site Uniontown, Ohio.* The SOW requires the following activities be implemented as part of the remedial design:

1. Site Security: Maintain a fence at the Site to prevent access and vandalism to the Site. Signs are to be posted with a telephone number to call for further information.
2. Submittal of a Remedial Design for Implementing the Remedy Selected in the September 2002 Record of Decision (ROD) Amendment: This Remedial Design Plan (Plan) outlines how the IEL remedy will be implemented.
3. Design of a Vegetative Cover for Remedial Action: This Plan describes the process for designing the elements included in the remedy, as required by the 2002 ROD.
4. Design of a Monitoring Program for Remedial Action: This Plan includes the design of a long-term monitoring program for groundwater and the gas extraction system in accordance with the 2002 ROD.

Sharp and Associates, Inc., (SHARP) has prepared this remedial design plan on behalf of the Responding Companies (The Goodyear Tire & Rubber Company, Bridgestone/Firestone, Inc., The B.F. Goodrich Company, GenCorp) to address environmental issues related to the IEL Site. This remedy has been designed to incorporate community preferences for a solution that:

- Protects Human Health and the Environment;
- Provides a Long-term Commitment to the Remedy by the Responding Companies that Includes Long-Term Monitoring and an Effective Contingency Plan;
- Maintains Greenspace and Fits into the Regional Site Setting;
- Enhances the Existing Diverse Wildlife Habitat;
- Allows for Local Future Land-use Control; and
- Promotes a Positive Community Image

This approved remedy, a biodiverse enhanced natural attenuation remedy builds on the current Site conditions that include:

- Confirmed natural attenuation of on-site landfill-derived hazardous constituents;
- No exposure to site-derived hazardous constituents nor indications of potential future off-site migration;
- No indication of any on-site exposure under current or anticipated future uses;
- A thriving and diverse ecosystem (wetlands, grassland, forest edge, and woodlands);
- Diverse wildlife (fox, deer, rabbits, hawks, northern orioles, frogs butterflies, turkeys, etc.);

- Diverse flora (locust, poplar, willow, sumac, phragmite, milkweed, green ash, apple, maple, wildflowers, etc.)

This document outlines the path forward for the IEL Site that will blend environmental requirements with community preferences to provide a holistic remedy that includes:

- Enhancement of the existing vegetative cover to manage the Site for habitat biodiversity and minimize the potential for exposure to landfilled materials;
- Maintenance of site security measures that minimize the potential for direct contact exposure;
- Modification of the existing groundwater monitoring network to ensure that detection of any migration from the Site of constituents of concern via groundwater;
- Confirmation of the performance of the remedy by groundwater sampling and analysis;
- Monitoring of the rates of production of methane; continuing the operation of the Methane Venting System (MVS) to ensure protection of human health and the environment; and
- Additional design studies: 1. A Risk Assessment to enable decision-making regarding future site land use; and 2. An evaluation of the MVS system.

## REMEDIAL DESIGN PLAN OUTLINE

This Design Plan is organized into the following sections:

**Section 1. Introduction, Including A Discussion of the Site History and Current Site Setting.** This section details the elements of the site history and current site setting that have an impact on the approach to and implementation of the remedial design.

**Section 2. Performance Standards and Specifications.** The performance standards for the overall remedy are designed to verify that the site presents no unacceptable threat to human health or the environment. The groundwater monitoring and MVS monitoring results will be used to verify the overall remedy performance. Other specifications associated with remedy implementation are also included in this section.

**Section 3. Site Security Issues.** The Responding Companies will maintain the existing chain link fence as needed to protect human health and the environment and secure the site from unwanted intruders. The vegetated soil cover is designed to limit direct contact with any site wastes. Other security-related issues (signage, deed restrictions, etc.) are included in this section.

**Section 4. Design of a Vegetative Cover.** This section describes plans to augment the vegetative cover at the Site to best manage it for its purpose of limiting direct contact with waste, providing erosion protection, and promoting wildlife diversity.

**Section 5. Design of a Monitoring Program.** The site monitoring program includes revisions to the existing groundwater monitoring network and a groundwater monitoring program that extends until the potential for threats to human health and the environment from site-related constituents in groundwater are demonstrated to be below levels of regulatory concern. In addition, an MVS monitoring program is provided to monitor the performance of the system.

# TABLE OF CONTENTS

# TABLE OF CONTENTS

**LIST OF FIGURES**

## LIST OF TABLES



## APPENDIX

# SECTION ONE

**REMEDIAL DESIGN PLAN for the Industrial Excess Landfill (IEL) Site**

## SECTION ONE: INTRODUCTION

The Responding Companies (The Goodyear Tire & Rubber Company, Bridgestone/Firestone, Inc., The B.F. Goodrich Company, GenCorp) have prepared this Remedial Design Plan (Design Plan) for the IEL Site (Site) that is protective of human health and the environment and incorporates site-specific characteristics into a holistic, sustainable remedy that addresses stakeholder remedial goals.

This Design Plan outlines the path forward for the remedial actions at the IEL Site that will blend environmental requirements with community preferences in accordance with the SOW, the Site Record of Decision (2002 ROD), USEPA Superfund Remedial Design Guidance, and other potentially-relevant guidance.

The remedy elements include:

- Augmenting the existing vegetative cover with selected planting of trees and other plants at the site;
- Natural attenuation of ground water contaminants both offsite and onsite;
- Monitoring of groundwater and landfill gas;
- Perimeter fencing;
- Deed Restrictions;
- Maintenance of Alternate Water Supply; and
- Additional Design Studies

### 1.1 SITE DESCRIPTION

The IEL site is located in a rural residential area in Lake Township, Stark County, Ohio approximately 10 miles southeast of Akron. See **Figure 1.** The site includes a ~30-acre closed landfill located approximately 0.4 mile south of the intersection of Cleveland Avenue and State Route 619 at 12646 Cleveland Avenue, N.W., in Uniontown, Ohio. The landfill was closed under Ohio law pursuant to a court order in 1980. USEPA purchased several adjoining properties such that the total site area now measures approximately 47 acres. The site is bounded by Cleveland Avenue to the west, Metzger's Ditch to the east, vacant land to the south, and residences to the north.

The site is situated in an area of rolling topography influenced by preglacial bedrock and glacial deposits. The landfill disposal area, which is enclosed by a fence, is approximately 1,100 feet in an east-west direction and 1,200 feet north-south. The landfill area slopes to the east and south at approximately 4 percent near the northwest and up to 20 percent in the south and east. Most surface water drainage from the site discharges directly or indirectly into Metzger Ditch along the eastern boundary of the site, which flows toward the south along the IEL site boundary. There are several ponded areas along the eastern border of the site near Metzger Ditch.

The landfill is currently covered by diverse grasses, shrubs, and trees. Based on site reconnaissance, several types of wildlife habitats are well-established. Three vacant buildings and their associated structures were removed in 2001 and replaced with a bed of wildflowers.

An active methane venting system (MVS) with 12 gas extraction wells is in-place and functioning in the western sector of the landfill, along the western half of the northern border of the site and along the western quarter of the southern border of the site. A facility for central collection blowers and gas flaring is present over the disposal area in the northwestern portion of the site.

The site has a network of monitoring wells that are used to monitor on-site and off-site groundwater quality. A map of the site that includes the locations of the existing monitoring well network is provided as **Figure 2.**

## 1.2 SITE HISTORY

Between 1956 and 1961, the IEL site was known as the Summit Sand and Gravel Pit and used as an open borrow pit to mine sand and gravel. Sand and gravel mining ceased when the water table was encountered in the excavations.

Mr. Charles Kittenger purchased the property in 1966 and initially used the site for flyash disposal. In September 1966, Mr. Kittenger obtained conditional licenses from the Lake Township Board of Zoning Appeals to operate the site as a landfill from 1966 until 1968; and in 1968, he received additional licenses to allow a variety of solid waste materials to be deposited at the site. The site became known by various names, including Kittenger's Landfill, Kittenger Industrial Landfill, and the Industrial Excess Landfill. Disposal was initially limited to inert materials. In 1968, disposal was expanded to include industrial waste. Liquids were deposited at the landfill between 1968 and 1971. In the early 1970's, municipal, residential and commercial waste disposal occurred. After 1971, hospital wastes and a variety of residential wastes were accepted at the site, including domestic putrescible and septic tank wastes. Two fires in the liquid waste lagoons at the landfill are believed to have resulted in the destruction of a significant quantity of liquids. Following the fires, the landfill was not permitted to receive liquids and was then used for the disposal of a variety of solid waste, including household waste and trash.

Coal ash was one of the first wastes disposed at the site and was placed in topographic depressions to reclaim flooded areas of the site, such as the area in the northwestern portion of the landfill. Ash was also mixed with other wastes and placed throughout the landfill. Liquid wastes are believed to have been disposed into a lagoon located in the north-central portion of the site. A common practice was to mix fly ash with the liquid wastes in the lagoon. This process reportedly increased evaporation and inhibited infiltration through the bottom of the lagoon by creating a lower permeability layer of residuum. This procedure was approved by the Ohio Department of Health in 1971. In 1980, pursuant to the requirements of the Stark County Common Pleas Court, the landfill was closed under the requirements of Ohio law with a soil cover.

USEPA and Ohio EPA concerns with the potential for methane migration from the landfill led to the installation of 13 passive gas vents in 1984. In October 1984, the IEL site was proposed for the National Priorities List (NPL) in response to concerns of local residents regarding the migration of landfill gas from the site, and possible groundwater contamination. The USEPA initiated a Remedial Investigation/Feasibility Study (RI/FS) and began field work in September 1985. The methane venting system was subsequently installed by the USEPA at the landfill to mitigate potential methane hazards.

A ROD was issued in 1987 to provide an alternate water supply to approximately 100 homes located to the west of the landfill. In July 1989, the USEPA issued a "final" ROD for a site remedy. The final ROD for the site was amended and reissued in 2000.

Subsequent to the November 14, 2000, *Petition to Change the Remedy for the Industrial Excess Landfill (IEL) Site, Uniontown, Ohio,* the USEPA conducted a Focused Feasibility Study that supported another ROD amendment. The September 2002 ROD Amendment calls for a remedy with the following components:

- Augmenting the existing vegetative cover with selected planting of trees and other plants at the site;
- Natural attenuation of ground water contaminants both offsite and onsite;
- Monitoring of groundwater and landfill gas;
- Perimeter fencing;
- Deed Restrictions;
- Maintenance of Alternate Water Supply; and
- Additional Design Studies

This Design Plan describes how The Responding Companies intend to implement 2002 ROD as required by the SOW.

## 1.3 Additional Information and Field Sampling Results That Support the Remedial Design

Groundwater monitoring wells were installed in the vicinity of the Site beginning in 1987. This monitoring network has been expanded over the years to the network presented in Figure 2. These wells have been sampled since 1988.

### 1.3.1 Groundwater Monitoring Results

Since August 2000, the Responding Companies have been conducting regular groundwater monitoring at the Site under an agreement with Lake Township and under the supervision of the USEPA, OhioEPA, and the Township's consultant.. Results from these events are tabulated and summarized in reports. These reports document that the only apparent impacts to site groundwater from the IEL Site are sporadic detections of low part-per-billion (ppb)

concentrations of Volatile Organic Compounds (VOCs). Current and historic VOC results from each well in the monitoring well network are summarized in the Appendix. These results show:

- Groundwater flows east-to-west in the vicinity of the site. The groundwater gradient flattens beneath the site but maintains its general east-to-west flow pattern.
- Off-site groundwater is NOT currently affected by constituents from the IEL site at concentrations that cause the groundwater to exceed USEPA drinking water standard maximum contaminant limits (MCLs) for any parameter.
- Modern, low-flow sampling techniques have documented that there is no evidence of any migration of metals from the IEL Site at levels that cause any off-site well to exceed MCLs for any metal.
- Some VOCs are typically detected in low-ppb concentrations in a few ***on-site*** wells. Only three of these VOCs are present at levels that exceed their respective MCLs.
- Although MCLs have been historically used for comparison to monitoring well sample analyses, this comparison is extremely conservative because no one in the downgradient vicinity of the IEL Site is using groundwater for drinking water purposes. Also, monitoring wells samples do not replicate the concentrations that would be generated by a drinking water extraction well at the same location.
- Double-cased wells installed through the landfill exhibit no detections of benzene or any other VOC contaminants.
- Single cased wells installed through the landfill show evidence of compromised completions – potentially acting as a source(s) for the on-site VOC results.
- Intra-well comparisons of on-site well results show that the number and concentrations of VOCs detected in Site groundwater continue to decrease.

In summary, there is no threat to human health or the environment from migration of constituents from the IEL Site via a groundwater pathway under current conditions. Site groundwater conditions continue to improve over time.

### 1.3.2 Aerial Photography Documenting Revegetation at IEL

A 1997 photograph of IEL is presented as **Figure 3.** This photograph shows that significant revegetation of the site has occurred since the landfill was closed in 1980. The site fence and site boundary are added to Figure 3 to yield **Figure 4** to show major site elements. This photo has been used as a base for several figures, including those attached to the *Petition to Change the Remedy for the Industrial Excess Landfill (IEL) Site, Uniontown, Ohio.*

An August 2000 photograph of IEL is presented as **Figure 5.** This photograph shows that substantial incremental revegetation has occurred between 1997 and 2000. The site fence and site boundary are added to Figure 5 to create **Figure 6.**

### 1.3.3 Field Sampling: Color Infrared Photography

**Figure 7** provides a color infrared photograph of the IEL Site and surrounding land in April of 1991. This image is a false color image, with display colors of red, green, and blue (RGB) assigned to near-infrared, red, and green light reflected off surface materials, respectively.

Healthy vegetation in this scene is shown by the color red. Bare soil and sparsely vegetative areas are shown by a tan/gray color. Standing water and shadows are shown in black, while the asphalt has a gray color.

The site fence and site boundary are added to Figure 7 to yield **Figure 8.** As evident in Figures 7 and 8, the IEL site had a sparse vegetative cover in 1991. A few groves of healthy vegetation (groves of emerging deciduous trees) are evident in the interior portions of the site. Also visible are areas of standing water in the northeastern and western portions of the site. The interpretation of the photograph is consistent with anecdotal reports of the appearance of the site during that time frame.

In conjunction with the aerial photography conducted in August 2000, a color infrared photograph of the site was taken. **Figure 9** shows the IEL Site using color infrared photography as it appears in August 2000. Figure 9 shows that the IEL site is nearly completely covered with a vegetative coverage that is vigorous and healthy. The only large non-vegetated areas on the site are associated with the access road to the MVS or with the properties located along Cleveland Avenue. These properties along Cleveland Avenue were demolished subsequent to August 2000 and wildflowers were planted in this area. The site fence and site boundary are added to Figure 9 to make **Figure 10.**

Note: the double line "roads" that are apparent in Figures 5, 6, 9, and 10 are actually the result of matting of grasses that resulted from the use of an all-terrain vehicle to access monitoring wells for sampling in August 2000. The "roads" are fully vegetated; the much greater intensity of the other areas in the photo illustrates just how vigorous the vegetative cover is.

The areal extent of healthy vegetation is much greater in the 2000 scene than it was in the 1991 scene. This aerial view is consistent with the results of the Wildlife Habitat Council and the agronomic investigations completed in 2000.

The United States Geologic Service (USGS) has provided the following write-up that accompanies color infrared photographs to aid in interpretation.

#### 1.3.3.1 THE INTERPRETATION OF COLOR INFRARED AERIAL PHOTOGRAPHY

Color infrared photography, often called 'false color photography', is widely used for the interpretation of natural resources. Due to the subjected degrees of degradation in handling before exposure and the use of high speed film in color infrared photography, aerial photographs can and do vary in overall color tone. This variability may cause complications within the interpretation of colors between each unique photograph. The following guidelines are provided for our customers to aid them in their interpretations of this particular type of photography.

Knowledge of vegetation vigor and density is important in the interpretation of the various red shades within aerial photography. The color red is frequently associated with live vegetation. Very intense shades of red indicate dense vegetation that is growing quite vigorously. An irrigated alfalfa field would be an example of such vegetation. An

evergreen forest, which also may be quite vegetatively dense, would not appear in a similar red tone since its level of growth activity is less compared to the irrigated alfalfa field.

As the amount of vegetation density and vigor decreases, the different red tones may change to more lighter red and pink colors. When the plant density activity becomes too low, the faint red coloring is overcome by the stronger colors representing the soil on which the plants have been growing. For instances such as these, the ground area would appear in shades of white, blue, or green, depending on the soil type and moisture content. When the plant vigor decreases, the vegetation would show as paler shades of red and pink, various shades of green, and possibly even tan in color. Dead vegetation, wheat stubble for example, would often be portrayed in tints of green or tan.

Bare soils appear as patches of white, blue, or green in most agricultural regions. Generally speaking, the moister the soil, the darker the soil color. Soil composition affects all color ranges shown on aerial photographs. Dry, sandy land will appear white in color. With the addition of moisture to this land, the white coloring turns into light gray or light tan. Soils composed of clay are darker in color than the sandy areas as well as tending toward more blue-green tones. Clay soils holding extreme moisture would resemble darker shades of the same colors. These identical soils, when high in organic matter, such as silt or loam, would be viewed darkest in the same corresponding color scheme.

In aerial photography, man-made features correlate their colors to the materials with which they were constructed. For example, asphalt (whose coloring ranges from dark to light) and concrete roads (whose coloring ranges from light to dark) vary in intensity on opposite ends of the color spectrum depending on their age. Gravel or dirt roads are shown as less intense colors due to their variations in soil make-up and composition. A town's streets and buildings could be considered similar to the above examples with their color also relying on their material textures.

Water, as expected, appears through various shades of blue ranging from nearly black to very pale. Pristine water has a black appearance. With the increase of sediment deposits in beds of water, the aerial photography colors turn slowly to lighter blue tones. Shallow water would reflect the material present in its stream bottom. For example, a shallow creek, bottom included, would be viewed as a white color in order to mirror the high levels of built-up sand.

Aerial photographs on degraded film cast an overall blue or green shadow on their images. When this occurs, the interpreter must consider how the overall cast has affected the original rendition of the photograph and therefore alter his or her scenic view.

### 1.3.4 July 31, 2003, Site Visit

SHARP visited the Site on July 31, 2003, to document any changes to site conditions that might have occurred since August 2000. In general, SHARP found the Site to be much more-heavily-

vegetated than noted in August 2000. Although the increase in density of vegetation is dramatic, the Uniontown area had received more than 14" of rain in the 2-3 week period preceding the site visit – potentially accounting for some of the density of vegetation. The Appendix contains annotated photos from the July 2003 site visit.

The western side of the site (outside of the fence, along Cleveland Ave.) looked well-vegetated. Wildflowers were in bloom (where they had been planted after demolition of the buildings) and the entire area was covered with either wildflowers or grass [see photos presented in the Appendix (Pictures 52-54)]. Sweet peas were blooming on both sides of the driveway leading onto the site (Picture 55).

We used a grid mapping system to note the location of any bare spots or unusual occurrences inside the fence (formerly landfilled area). The site was visually divided into 25 grids (each grid was approximately 200 feet by 200 feet). The grid sections on the map were numbered starting at the entrance and proceeding east to west. We walked each grid section and noted any unusual occurrences (bare spots, downed fence, etc.). **Figure 11** presents the gridded site map with major observed features summarized.

In general, the site looked healthy. There is abundant vegetation / shrubs / trees / grasses. Plants were large and the grass was high. Everything looked healthy; there were many large trees. The first bare spot we came across was in grid section #2. It was a small spot measuring ~5 feet by 5 feet, located about 100 feet from the north fence (Pictures 4 and 5).

The northeast corner of the site was very woody and dense. There was an area on the slope that is washed out and requires attention to eliminate further erosion. A few trees were noted to be down in this area. Some of the downed trees fell on the perimeter fence and the fence itself was downed (Pictures 12 and 13). There were sections of downed fence on the northeastern portion of the site, a small section on the southern portion of the fence, and a small section on the western portion of the fence. To maintain the existing fence, approximately 300 feet of fence will need to be replaced. The remainder of the fence was intact and secure. The man gates on the north side fence looked fine.

A second large bare spot was observed between grids #10 and #15 on the eastern slope. The bare spot measured ~50 feet by 20 feet and was approximately 130 feet from the east side fence. This bare spot had no vegetation growing in it (Picture 14). The third major bare spot was in grid #8 at the top of the slope (Picture 17). This spot measured ~20 feet by 20 feet. This bare spot also had no vegetation growing in it.

Although there were quite a few thin spots on the eastern and southern ***slopes*** of the site, these thin spots had tall vegetation growing around the area and were thin of topsoil but nevertheless had sparse vegetation growing. These areas tended to be gravelly (Pictures 23, 27) but appeared to be in the process of revegetation. The largest thin spot found was ~20 feet by 10 feet.

We observed lots of birds and saw a male cardinal. There were many butterflies and insects and we heard frogs in the swamp area. We saw deer droppings. Overall, we observed a wide variety of wildlife on the site.

On the eastern side of the site (at the fence line) there was standing water and the surrounding area was very wet.

We observed occasional debris throughout the site. The debris mainly consisted of items apparently left over from the construction/maintenance of the methane collection system. Items included flexible black tubing, rebar stakes, and white PVC piping. On the southern portion of the site, there were some guardrail / handrail pieces that were lying on the ground. These items were difficult to see because the vegetation/grass was so tall. Other than the debris apparently left over from the methane collection system activities, we found very little evidence of dumping of debris.

### 1.3.5 August 15, 2003, Site Visit

SHARP returned to the IEL Site to evaluate the need for vegetative cover enhancements. Subsequent to the July 31, 2003, visit, the MVS contractor had performed a mowing event where he mowed:

- all non-treed areas outside the fence on the west side of the Site;
- the vicinity of the MVS; and
- paths to the MVS wells.

The results of the Site visit are summarized below and detailed in photos presented in the Appendix. In the visit to the Site, SHARP found:

- Much greater site visibility (portions of MVS visible) after mowing the wildflower area planted at the former Uniontown Tire (Picture 1).
- Heavy vegetation that is nearly impenetrable except where mowed (Pictures 2,3).
- Emerging forested islands in former (circa. 2000) grassland areas (Pictures 4, 5, 6)
- Grassland areas showing evidence of succession to forest (trees) but few shrubs (Pictures 7,8,9,10,11, 12, 14).
- Some forested islands that are further along in succession (Pictures 13, 15).
- The lower-lying grassland areas that are not populated by grasses but by wildflower and other ground cover (Pictures 2, 15).
- Mowing has significant impact on visibility and site appearance (Pictures 1, 16).

In summary, there has been significant additional emergence of trees on the site since August 2000. There are few, if any, areas within the fence that need any trees planted to achieve the planned future ecological regimes. There are emerging forested islands that have sufficient trees but may need some shrubs planted. The site should be mowed to establish/maintain edge environments (see next section). Some trees/shrubbery may need to be planted to adjust visibility of the fence/Site equipment.

### 1.3.6 Wildlife Habitat Council Investigation / Recommendations

The Responding Companies invited the Wildlife Habitat Council (WHC) to evaluate the habitats present at the Industrial Excess Landfill Site and develop a plan to enhance the site habitats that would be consistent with community preferences yet within the range of activities that could be accommodated at the IEL Site at present or in the future. The resulting report on the investigation: *Opportunities for Wildlife Habitat Enhancement at the Industrial Excess Landfill* (See Appendix) details a menu of potential habitat enhancement projects for IEL. The WHC Report should be considered in developing the specification for the construction work associated with the remedy implementation, as updated based upon more recent information.

### 1.3.7 ANS Site Investigation Report / Recommendations

Applied Natural Sciences (ANS) conducted an agronomic site investigation in the summer of 2000. The full ANS report is presented in the Appendix. The ANS report, as updated based upon more recent information, will be used to develop a specification for the remedy implementation. Elements of the potential habitat enhancement include the development of forested islands (**Figure 13**) through selected plantings and edge environments through rotational mowing (**Figure 12**).

## 1.4 Current and Future Ecological Regimes Proposed in Petition

Based on the information available in November 2000 and the recommendations of the ANS and WHC Reports, the Responding Companies petitioned the USEPA to modify the remedy to one that would allow the site to migrate from the current ecological regimes presented in **Figure 14** (Figure 1 of the Petition) through tree planting as noted in **Figure 15** (Figure 2 of the Petition) to the future ecological regimes presented in **Figure 16** (Figure 3 of the petition).

Information collected since November 2000 shows a site that is rapidly reforesting such that little tree/shrub planting is required to establish forested islands in the "tree planting areas" noted on Figure 15.

## SECTION TWO. PERFORMANCE STANDARDS AND SPECIFICATIONS

The Responding Companies have designed a remedy to maintain protectiveness of human health and the environment. This is the principal remedy performance standard. The remedy has also been designed to incorporate stakeholder goals for habitat biodiversity and creation / maintenance of green space.

### 2.1 DESIGN ASSUMPTIONS

Assumptions inherent in the design and parameters relevant to the design are summarized below:

Assumptions:

1. Current conditions at the Site do not pose an immediate threat to human health or the environment.
2. No changes to Site use will be made until the potential impacts of those changes have been evaluated and shown to allow the remedy to remain protective.
3. The remedial design addresses areas of the site located within the footprint of the historic landfill. Final decisions on modifications to areas both inside and outside the fence will be addressed based on future evaluations.
4. USEPA will retain control of Site access until all construction-related elements of the remedy have been implemented and a risk assessment study has been completed to determine what types of future uses and site access restrictions are protective of human health. Access to the Site is currently controlled by the USEPA under the Superfund program.
5. The groundwater at the Site will be monitored until remedial goals (MCLs) are met throughout the site or otherwise addressed.
6. Work plans for the Site will be modified and submitted to USEPA for review and approval as needed to perform the remedial design implementation.

### 2.2 REMEDIATION GOALS AND THEIR ATTAINMENT

The performance standard for the remedy will be to maintain protectiveness of human health and the environment under current and future Site uses. The protectiveness of the remedy under current conditions depends in part upon minimizing contact with landfilled constituents, including contact with groundwater located beneath the Site. Although no future use of groundwater beneath the site is planned, USEPA policy considers this groundwater to be a potential drinking water resource. As a result, USEPA drinking water standard Maximum Contaminant Levels (MCLs) are considered remedial goals. Future use scenarios under consideration minimize the potential for contact with the landfill contents using engineering and administrative controls.

Maintenance of the performance standard and progress toward achieving remedial goals will be achieved through:

- Maintaining the current fencing until a risk assessment is completed;
- Confirming that access control is sufficient to prevent unacceptable exposures at the site until a risk assessment study has been completed to determine what types of future uses and site access restrictions are protective of human health;
- Augmenting the existing vegetative cover with selected planting of trees and other plants at the site;
- Monitoring groundwater to confirm that human health and the environment continue to be adequately protected from site-related constituents of concern in groundwater; and
- Evaluating monitored natural attenuation to determine progress toward meeting cleanup goals (MCLs);
- Monitoring landfill gas concentrations to confirm that human health and the environment continue to be adequately protected from landfill gas emanating from site, and also to determine what if any modifications should be made to the existing methane gas venting system.

Attainment of Remediation Goals will be determined through:

- Confirmation that site vegetation is sufficient to prevent erosion or contact with landfill constituents that would constitute a threat to human health and the environment;
- Results of groundwater monitoring (See Section 5); and
- Results of landfill gas monitoring (See Section 5).

## 2.3 DISCUSSION OF ARARS

Applicable or Relevant and Appropriate Requirements (ARARs) are those environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or potentially relevant and appropriate for a Superfund site or action.

*Applicable* requirements are those clean-up standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances found at a Superfund site.

*Relevant and Appropriate* requirements are requirements that, while not legally "applicable" to circumstances at a particular Superfund site, address problems or situations sufficiently similar to those encountered at the site that their use is well-suited.

*To be Considered (TBC)*: In addition to legally binding laws and regulations, many Federal and State environmental and public health programs also develop criteria, advisories, guidance, and proposed standards that are not legally binding, but that may provide useful information or recommended procedures.

### 2.3.1 Types of ARARs

There are three categories of ARARs for Superfund remedial actions:

- Chemical-Specific;
- Action-Specific; and
- Location-Specific.

Chemical-Specific ARARs are typically health-based numerical criteria which are used to establish acceptable concentrations or amounts of a chemical that may be discharged to or present in the environment. Chemical-specific ARARs for IEL include USEPA Drinking Water Standard Maximum Contaminant Levels (MCLs). MCLs are examples of chemical-specific ARARs that are applicable (at the tap) to public drinking water supply systems that have at least 15 service connections or are used by at least 25 people.

MCLs are not directly applicable for the IEL Site because there is no drinking water supply system affected by groundwater from the IEL Site. MCLs are considered to be relevant and appropriate to groundwater near IEL because this groundwater is still considered (by USEPA) to be a potential drinking water source.

Action-Specific ARARs are requirements that pertain to the particular remedial actions that are proposed at the site (e.g., monitored natural attenuation, landfill gas control, etc.). The following are examples of action-specific ARARs for IEL:

- Worker protection requirements under 29CFR 1910.120 are applicable to the IEL Site remedial activities.
- The "EPA Guidance on MNA at Superfund Sites, RCRA Corrective Action, and UST sites," April 1999: OSWER Directive 9200.4-17P is a TBC for the IEL Site.

No changes are currently planned to the operation of the MVS system. As a result, all current action-specific ARARs for the MVS system will continue to be complied with.

Location-Specific ARARs are restrictions placed on a remedy because of the Site location. Examples include regulations that apply to flood plains or historic sites. The USEPA has identified issues related to the former landfilling operations as location-specific. Thus, location-specific ARARs for the IEL Site include landfill gas monitoring requirements. **Table 5** lists ARARs for the IEL Site Remedial Design and a discussion of their potential relevance.

## 2.4 OUTLINE OF REQUIRED SPECIFICATIONS

Elements of the remedy include construction and monitoring. The remedy construction specifications are included in a specification and bid package presented in Appendix 7. Other specifications related to monitoring or maintenance of the site will be presented in the activity-specific work plan to be developed.

## 2.5 REAL ESTATE, EASEMENT, AND PERMIT REQUIREMENTS

All activities shall be conducted in accordance with local, state, and federal requirements, guidelines, and ordinances. Access to the Site is currently under the control of the USEPA. This

condition is expected to persist through the remedy implementation. Thus, any conveyance of real estate is beyond the scope of this remedial design. According to the Stark County Auditor's tax maps, the Site is currently owned by at least 3 entities, as follows:

- Industrial Excess Landfill, Inc., currently owns 29.86 acres of the historically landfilled portion of the property including the access road.
- Hybud Equipment Corp. currently owns 1.5 acres along the west side of Cleveland Avenue extending into the fence indent at the IEL Site.
- The United States of America owns approximately 12 acres of properties in the vicinity of the Site.

While there are no currently-recognized needs for any real estate easements, acquisitions, or conveyances, USEPA (or any successor entities that assume control of the Site access and/or management), has the authority to manage these issues, should they arise. The Responding Companies will provide recommendations for future site use restrictions based upon risk assessment.

As necessary for remedy implementation or continued operation and maintenance, the Responding Companies (or their designated representatives) will obtain any state and local permits necessary to do planned work. Details on required permits, etc., shall be included in the Work Plan for the specific activity.

## 2.6 FINAL PERFORMANCE STANDARD VERIFICATION PLAN

Performance standards and their verification, including contingency plans are included with the two monitoring programs presented in Section 5. Thus, no separate Performance Standard Verification Plan will be submitted.

## 2.7 FINAL CONSTRUCTION QUALITY ASSURANCE PLAN

A final construction quality assurance plan will be developed prior to mobilization for remedial construction at the Site. The plan will be designed to verify that the remedy implementation has occurred in accordance with the approved Remedial Design Plan and related requirements.

## 2.8 MAINTENANCE OF ALTERNATE WATER SUPPLY

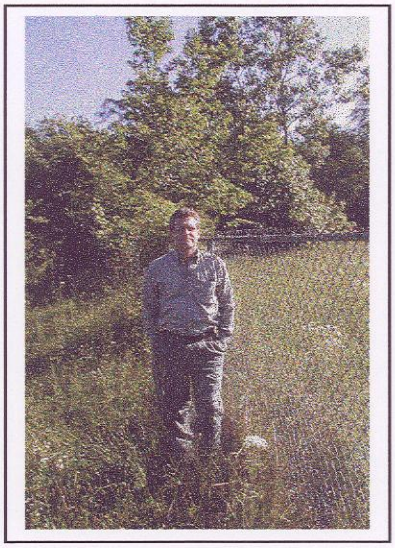
The Responding Companies provided a grant to the local water authority to establish the alternate supply. Although the maintenance of alternate water supply is identified in the 2002 ROD as a required element of the remedy, the Responding Companies have no control over this activity. Maintenance of the supply is not part of the Responding Companies' scope of remedy implementation.

# SECTION THREE

## SECTION THREE. SITE SECURITY

### 3.1 SITE FENCE

The Responding Companies will maintain the existing 5'-high chain link fence for site security for site security purposes (prevent unauthorized vehicle access and limit unwanted trespassers). The July 31, 2003, Site visit detailed no evidence of any trespass. The July 2003 photo below illustrates the existing fence.



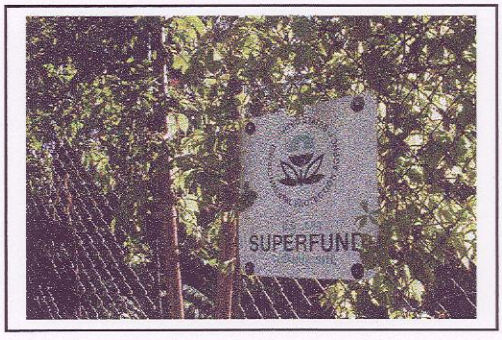
The existing fence has been damaged by downed trees or is otherwise not intact in a few places (<300' = ~6% of fence length). The damaged areas are largely associated with inaccessible areas of the site. Because the principal value of the fencing is to prevent vehicle access that might damage the vegetative cover, the integrity of the fence in inaccessible areas is not a time-critical issue. Fence repair will be performed contemporaneously with other site remedy construction activities. As needed, fence repair of the western and northern boundaries (the more accessible areas) will be completed as soon as practical.

To be consistent with stakeholder goals, the remedial design envisions allowing existing vegetation to grow amongst the fencing. This vegetated condition enhances its ability to limit Site access without impairing the natural appearance of the site desired by many stakeholders.

There have been some "future use" discussions concerning moving the east side of the fence. In addition, future uses may incorporate an outer decorative fence to mark walking trails, etc. Decisions on future use elements (fence moving, outer fencing, etc.) will be based on the results of the risk assessment.

### 3.2 WARNING SIGNS

The remedial design plan envisions installing four new warning signs, attached to the fence, one on each of the four sides. These signs will replace the single sign located at the main gate (reproduced in the following photograph).




The new signs will include the following information, at a minimum:

This is the Industrial Excess Landfill Superfund Site.
This site is managed by the U. S. EPA.
For information about this site, please call:

Timothy Fischer, Remedial Project Manager
(312) 886-5787 or

Dave Novak, Community Involvement Coordinator
(312) 886-7478

## 3.3 DEED AND FUTURE USE RESTRICTIONS

Through implementation of the remedy, Site access will be restricted in a manner that maintains protectiveness of human health and the environment. Any deed conveyance and / or future use restrictions for the site are beyond the scope of the remedy implementation, because USEPA (or any successor entities that assume control of the Site access and/or management), has the authority to manage these issues. The Responding Companies will make recommendations on future use restrictions based upon the results of the risk assessment.

This Remedial Design is intended to enable potential future uses that are consistent with stakeholder goals, to provide valuable wildlife habitat, and greenspace. Future use scenarios will be evaluated under the additional design studies. This evaluation will consider the potential for risks from contact with the landfill contents using a risk assessment. The results of the risk assessment will determine under what conditions limited site access remains protective of human health and the environment.

## 3.4 OPERATION AND MAINTENANCE ISSUES ASSOCIATED WITH SITE SECURITY

The IEL site security will be maintained using the existing fencing. Where the fence has deteriorated, it will be repaired/upgraded as needed within the remedial goals of protecting human health and the environment. Site security will be periodically inspected in conjunction with other site operations and maintenance plans, by observing the following:

- Structural integrity of fencing and fence posts.
- Operability of gates.
- Any holes in fencing or signs of unauthorized entry.
- Integrity of locks.
- Integrity of signs.

If the inspector finds any evidence of a Site security breach, appropriate actions will be taken to address the breach.

The Operations and Maintenance Plan for the site will be developed to include specifics on the frequency of inspection, action triggers, etc.

# SECTION FOUR

# SECTION FOUR. DESIGN OF A VEGETATIVE COVER

This section describes plans for enhancement of the existing vegetative cover to prevent erosion and promote a diverse ecology while maintaining a site that is protective of human health and the environment. This remedy addresses environmental impacts from historic landfilling operations and potential plans for areas outside the historic landfill. The vegetative and habitat enhancements described in this plan will be reviewed and modified as necessary to incorporate stakeholder goals based on recommendations of the Community Action Group (CAG), USEPA, OhioEPA, and The Responding Parties.

## 4.1 WHC AND ANS REPORTS USED AS BASELINE

The WHC and ANS reports describe (in 2000) a vision for future ecological regimes that is not very different from the existing (2003) site conditions. These reports and successor investigations that better describe *current* conditions will be used as guides to implementing the remedy. As necessary, additional detailed design studies of the vegetative cover using the WHC, ANS, and CAG recommendations will be conducted to support meeting stakeholder goals.

## 4.2 APPROACH TO HABITAT ENHANCEMENT

As detailed in the specification, the remedy implementation will include retaining a wildlife biologist (or equivalent) to determine how best to implement the habitat diversity projects. The remedy construction is expected to include:

- Mowing to establish edge environments;
- Selected tree and shrub planting to improve forested islands; and
- Installations of nest boxes and raptor perches, etc.

## 4.3 PROPOSED SITING/LOCATIONS OF PROCESSES/CONSTRUCTION ACTIVITY

Construction activities shall be staged from the area located near the MVS system, located near the current main gate. To the extent practical, construction activity staging shall be conducted within the fenced area.

## 4.4 PRELIMINARY PLANS, DRAWINGS, AND SKETCHES, INCLUDING DESIGN CALCULATIONS

See specification included with the Appendix. The specification includes preliminary details of implementation of the enhancements. The actual implemented enhancements will be based upon the mutually-agreed upon plans developed by merging stakeholder visions.

## 4.5 DEBRIS REMOVAL

As part of the remedy implementation and the operations and maintenance activities, visible debris shall be removed from the site and placed in a container maintained near the MVS. As needed, the contents of the container shall be properly disposed of off-site.

## 4.6 SPECIFICATION

The specification details the construction-related elements required for the IEL Site remedy implementation. It includes:

- Fence repair and signage;
- Vegetative cover enhancement and management for habitat diversity;
- Debris removal and disposal; and
- Rework of the groundwater monitoring well network.

# SECTION FIVE

## SECTION FIVE. DESIGN OF A MONITORING PROGRAM.

Site groundwater and MVS monitoring programs are summarized in this section. The overall monitoring program has been designed to ensure that implementation of the Remedy complies with the 2002 ROD Amendment for IEL. Elements of the monitoring program include:

Groundwater:

- Updating of the existing groundwater-monitoring network based on the current knowledge of Site groundwater and Site monitoring goals.
- Monitoring groundwater elevations and constituents of concern in groundwater until cleanup levels are achieved or such time as it is determined that further groundwater monitoring is not necessary to protect human health and the environment.

MVS:

- Evaluation of the MVS system performance to determine any need for modifications;
- Evaluation of areas of the landfill that are not currently covered by the MVS to determine if expansion/upgrading of the MVS is necessary;
- Continuation of the Methane Venting System (MVS) monitoring program until such time as it is determined that the MVS system is no longer necessary to protect human health and the environment.

### 5.1 ASSESSMENT OF THE GROUNDWATER MONITORING NETWORK

In the more than 18 years of groundwater monitoring and study at the IEL site, numerous groundwater-monitoring wells have been installed and a thorough understanding of groundwater conditions has been achieved. The goal of the groundwater monitoring component of this remedy is to ensure that there is no threat to human health and the environment from site-related hazardous constituents in groundwater. Toward this goal, the groundwater monitoring system has been redesigned to provide information useful in making that determination in as clear, concise, accurate, and efficient a manner as possible. In addition, the monitoring program has as a goal, demonstrating that natural attenuation will continue to be effective and that remedial goals will be met throughout the site.

The wells in the current monitoring network were installed at various times and as parts of multiple investigations conducted by numerous investigating entities. The product of this highly varied history of methods, technical approaches, and interpretations has been the creation of a system of groundwater monitoring wells that is neither wholly representative of the uppermost continuous groundwater aquifer nor the proper vehicle for extended monitoring of the performance of the Site remedy. There are numerous cases of deteriorated surficial well installations and questionable subsurface well completions. Normal physical deterioration, subsidence, frost heave, and mass movement have affected several wells, particularly those completed within the bounds of the former landfill. Any of these physical means of deterioration provide potential conduits for contaminants into the uppermost continuous groundwater unit.

Figure A-2, which is reproduced from the *Summary Report on an Assessment of Individual Groundwater Monitoring Wells at the Industrial Excess Landfill (IEL) Site and the Regional Hydrogeologic Setting, December 12, 2000, (Revised August 2003)* [Well Evaluation Report] permits a visual comparison of monitoring well completion intervals, elevations, and stratigraphy with respect to historically-defined "shallow, intermediate, and deep" designations. In addition, Figure A-2 provides identification of those wells that have historically not detected any VOCs.

To address the inadequacies of the present monitoring well system, the Site's 58 monitoring wells were evaluated using both current and historic information that includes:

- The physical, field documented condition of the well;
- The well's analytical groundwater results;
- The appropriateness of each wells completion depth; and
- The applicability of the well location to the purpose of monitoring the uppermost continuous groundwater aquifer at the Site.

## 5.2 REDESIGN OF THE MONITORING WELL NETWORK

There are fifty-eight (58) monitoring well installations associated with IEL. These wells have their locations shown on **Figure 17**. Of these 58 wells, 23 have been identified as being more representative of the uppermost continuous groundwater aquifer (See Well Evaluation Report and **Table 6**). The Well Evaluation Report allowed grouping of types of wells that gave rise to a tiered well-designation scheme that is being used as part of the current Four Year Groundwater Monitoring Plan which was initiated in August 2000. The 58 wells and their existing tier designations are listed in **Table 7.** The tiered approach allowed targeting of the sampling program to maximize the value of the collected data by collecting samples from those wells that give the most information about any changes to Site conditions.

A similar process has been followed to identify criteria upon which to develop the future monitoring well network. Each well was evaluated to determine whether that individual well provides information to evaluate Site groundwater in the uppermost continuous groundwater unit. Some wells were determined to be not useful for these purposes and designated for proper abandonment, as follows:

**Decision Rules for the Abandonment of Selected Site Monitoring Wells:**

1. Monitor wells that are completed within the Carlisle Muck will be abandoned because they do not provide useful information on the uppermost continuous groundwater unit water quality.
2. Monitoring wells identified as "broken", either at their surface completion or within their subsurface construction will be abandoned because they do not provide useful information

since it is impossible to determine whether they can yield samples that are representative of groundwater quality.

3. Existing monitoring wells located within the area of fill that are not of double-cased construction will be abandoned because they do not provide useful information since it is impossible to determine whether they can yield samples that are representative of groundwater quality. Per the RI/FS (Section 4, Page 85 of 128): "MW07S, which is partially completed in waste" will be properly abandoned. Although the well log for MW-7S does not indicate the presence of significant waste, the well is apparently acting as a landfill gas vent and potential conduit to groundwater, in part because it is screened across the water table. Using the decision rules included herein, this well should be abandoned to eliminate the potential for migration to groundwater and because the well does not provide information that is representative of the uppermost continuous groundwater unit.
4. Some monitoring wells in which no detectable levels of contaminants have been identified for greater than 10 years, do not provide useful information since it has already been demonstrated that the zones they monitor are not affected by site constituents; therefore further information from them is superfluous. Other wells in which no contaminants have been detected for greater than 10 years will be retained to insure appropriate areal coverage of the Site's groundwater monitoring network.
5. Some monitoring wells that are not currently needed will nevertheless be retained as contingency wells in case monitoring results show the need to monitor these areas.

To evaluate the relevance of existing well placements and to identify where additional monitoring wells may be necessary, previously published quarterly potentiometric maps of the uppermost continuous groundwater unit were reviewed. A potentiometric map using water level measurements collected on July 18, 2003, is included as **Figure 18.** This figure demonstrates the east-to-west groundwater flow beneath the Site and the dominant influence of the buried bedrock valley located immediately west of IEL.

This groundwater flow, in the uppermost continuous groundwater aquifer, has remained consistent through many years of measurement. Groundwater flow and concentration trends are also well understood. Many years of site groundwater monitoring data demonstrate that some existing wells are redundant and/or irrelevant to the groundwater monitoring of IEL.

An inventory of the existing IEL monitoring wells is provided **(Table 8)** with recommendations for the proposed fate of each well. Also included on the table is the supporting rationale.

Located at the bottom of Table 8 are recommendations for five new wells:

- MW-17 New to replace, in part, MW-17s and MW-17d (but at a location slightly upgradient and beyond the limits of the landfill);
- MW-16 New to replace, in part, MW-16 but at a location beyond the limits of the landfill to provide perimeter coverage to the north;
- MW-29 and MW-31, located downgradient of MW-13i New, MW-14i New, and the "15 series"; and
- MW-30, located upgradient of the Site (at the sod farm).

The product of these assessments and recommendations concerning the IEL groundwater monitoring network produces a network consisting of 30 wells that better characterize and protect the upper continuous groundwater unit and any potential downgradient receptors. This network is presented on **Figure 19 and Figure A-3.** As can be seen in these two figures, the resulting network includes:

- Wells that encircle the Site in all the compass directions;
- Wells screened in the uppermost continuous groundwater unit – a sand and gravel matrix – at elevations between 1040' and 1105' (National Geodetic Vertical Datum, 1929).
- Wells at the western and southern perimeter screened both above and below the uppermost continuous groundwater unit.
- Elimination of duplicate wells at the same location, where possible
- Elimination of some deep bedrock wells that have never shown any contamination and some very shallow wells that exhibit water perched above the uppermost continuous groundwater unit.

## 5.3 GROUNDWATER MONITORING NETWORK MODIFICATIONS

### 5.3.1 Well Abandonment

Site monitoring wells (and any other wells or monitoring points) identified as needing abandonment will be properly abandoned in accordance with an approved well-abandonment plan using procedures that are in accordance with the *State of Ohio Technical Guidance for Sealing Unused Wells*, developed by the State Coordinating Committee on Groundwater. Well abandonment activities will be performed by a driller licensed in the State of Ohio.

### 5.3.2 Well Network Tier Designations.

The value of information collected from sampling and analysis of the monitoring well network will vary depending upon the wells sampled. As in any monitoring well network, information from some wells is more valuable than others. With this network, a set of Tier designations has been developed to maximize the value of the monitoring program. These tiers are detailed below and summarized on **Table 9**.

**Tier Summary**

| Tier Designation | Well Description | Monitoring Purpose / Approach |
|---|---|---|
| **Sentinel Wells: 8 wells:** 1s, 1i, 7i, 21s, 11s, 11i, 29, 31 | Located along western boundary of landfill | Will detect migration downgradient from landfill if it occurs |
| **On-Site Wells: 2 wells:** 13i and 14i | Double-cased new wells installed through waste | Provide early indications of migration from landfill contents |
| **Background: 2 wells:** 12i, 30 | Upgradient. | Identify regional changes; monitor naturally-occurring constituents |
| **Perimeter Wells: 7 Wells:** 3i, 18i, 18s, 22i, 16, 17, 23s | Along landfill perimeter but cross-gradient | Provide coverage of uppermost aquifer in all compass directions |
| **Downgradient Wells: 5** 24i, 25s, 26s, 27i, 10i | Further downgradient than sentinel wells | Allow measurement of extent should sentinel wells show detects |
| **Contingency Wells: 6** 9i, 1d, 20s, 11d, 21i, 7d | Western/southern boundary wells retained | Sampled only if results in 1i, 11i, 21s, 7i, and 30 warrant |
| **New Wells: 5** 16, 17, 29, 30, 31 | Replacement: 16, 17<br>Background: 30<br>Sentinel 29, 31 | Northside boundary coverage<br>Better sentinel well coverage<br>Better background location |

Wells located on the downgradient portion of the Site (i.e., sentinel wells) are given the highest priority and sampled most frequently. Wells that have never shown any contamination, wells located upgradient or cross-gradient of the Site and background wells are given lower priorities.

Although background wells can provide valuable information when addressing naturally-occurring site constituents of concern, they have little value when the site constituents of concern are VOCs (like at IEL) because there is no "background" contribution. This tiered well designation was used to develop a groundwater monitoring program that focuses on collecting the most important groundwater quality information.

## 5.4 GROUNDWATER MONITORING PROGRAM

The groundwater-monitoring program has been developed as required by the 2002 ROD Amendment to ensure detection of changes in the chemical concentration of contaminants in the groundwater beneath and adjacent to the site. The purpose of the groundwater protection monitoring plan is to document that Site remedial goals continue to be met; i.e., that the Site does not pose an unacceptable threat to human health or the environment as a result of migration of constituents from the IEL Site, that natural attenuation continues to occur at an acceptable rate, and that progress continues until remedial goals (MCLs) are met throughout the site. In addition, the monitoring program has been designed to elucidate trends or other information that may demonstrate the permanence of the remedy.

Groundwater data collected to date will be used in conjunction with that already collected as part of the Groundwater Monitoring Program to establish groundwater trend analyses. Monitoring will continue before, during, and after implementation of the remedy – eventually phasing into less frequent monitoring as the monitoring shows improving trends.

As appropriate, groundwater-monitoring data will be evaluated with statistical methods consistent with USEPA guidance. However, as most site wells show no detects or only a few detections of near-detection-limit concentrations, the ultimate proof of remedy performance will be non-detects of all VOC constituents.

Data will be routinely analyzed to ensure that decreasing trends continue and no increasing trends are discovered that indicate a threat to human health or the environment.

### 5.4.1 Statistical Analysis Methodology

The statistical methods proposed to assess and demonstrate attainment are consistent with the guidance documents: Methods for Evaluating the Attainment of Cleanup standards - Volume 2: Groundwater (USEPA 1992) and The Lognormal Distribution in Environmental Applications (USEPA, ORD-OSWER, 1997). Because existing data exhibit no unacceptable threat to human health or the environment, the data will be primarily evaluated to ensure that no statistically increasing trends exist.

Data from the previous and current monitoring programs will be tabulated and summarized graphically. Once sufficient data have been collected (as defined by EPA's Methods for Evaluating the Attainment of Cleanup Standards) a statistical evaluation will be performed. As part of this statistical evaluation, a determination will be made as to whether sufficient data are available. Subsequently, no statistical treatment may be needed as long as concentrations continue to decrease. As needed, statistical analysis will be performed to confirm no increasing trends.

For those parameters where there are a limited number of non-detected results, averages and standard deviations for the concentrations of each parameter will be calculated for each year of monitoring, and a grand average and standard deviation will be calculated for these yearly values for the entire monitoring period. For those parameters where a large number of non-detected concentrations are measured, the $90^{th}$ percentile concentration will be determined for the entire monitoring period. The comparison to the cleanup standard will be based on using this $90^{th}$-percentile concentration.

As described in the USEPA 1992 technical guidance document, the statistical evaluation will determine if the grand average or the 90-th percentile concentration is less than the cleanup standard. Once this has been demonstrated, it is necessary to determine if sufficient data are available to conclude that the attainment had been reached considering false positive and negative error rates of 10 percent. If data are deemed insufficient based on this analysis, then monitoring will continue for another year or for as long as necessary to acquire sufficient data to demonstrate attainment. If data are sufficient, a trend analysis will be performed to demonstrate that the data do not exhibit a statistically increasing trend at the 90-percent significance rate.

For these types of analyses, the samples must be collected in each well for each sampling event, and thus the same number of samples will be collected from all wells within the group. The population mean or upper percentile calculated for the group on an annual basis will be the

statistical parameter used to assess attainment. For wells with non-detectable concentrations of COCs reported, the method detection limit will be used in the calculations of the mean.

References:
United States Environmental Protection Agency, 1992, Methods for Evaluating the Attainment of Cleanup Standards, Volume 2, Groundwater.
USEPA, ORD-OSWER, 1997, The Lognormal Distribution in Environmental Applications

## 5.5 GROUNDWATER MONITORING FREQUENCY

Groundwater monitoring will be conducted in accordance with Table 9 and Table 10. The proposed schedule for monitoring incorporates the following information:

- VOCs are the constituents of greatest potential concern for groundwater. Groundwater concentrations of Metals and SVOCs have not been shown to be affected by migration from the IEL Site.
- Site monitoring using the existing monitoring well network has been conducted for more than 16 years; this monitoring provides a baseline that obviates the need for extensive quarterly monitoring.
- USEPA requested 5 years of quarterly sampling prior to the CERCLA 5-year review. In response to that request, the Responding Companies have designed a program that will provide a total of 18 monitoring events (from August 2000 through May 2006) that are completed before the next CERCLA 5-year review.
- Newly-installed wells will be sampled for all parameters for four consecutive events to provide a baseline.
- All wells in the network (except the contingency wells) will be sampled in each of the next 4 events.
- The groundwater monitoring program will be re-evaluated with the next CERCLA five-year review.

## 5.6 ISSUES ASSOCIATED WITH GROUNDWATER MONITORING.

### 5.6.1 Work Plan Development

As part of the development of this groundwater-monitoring program, The Responding Companies will update the approved Site Sampling and Analysis Plan and Quality Assurance Project Plan as needed to incorporate the agreed-upon approach.

### 5.6.2 Contingency Plan Development

As part of the development of this groundwater-monitoring program, The Responding Companies will prepare and submit for approval, a Contingency Plan to address the process that will be followed should groundwater monitoring indicate a potential threat to human health or the environment. A draft copy of the Contingency Plan is included with the Appendix.

### 5.6.3 Maintenance Issues Related to the Groundwater Monitoring Program

Access and integrity of the Site monitoring well network will be maintained as detailed in a Site-wide operations and maintenance plan for the Site to be developed.

## 5.7 MVS Monitoring Program

The MVS operations, maintenance, and monitoring program will continue in exactly the same form (detailed in Table 11) until the MVS system evaluation is complete. As a result of the MVS system evaluation conducted as an additional design study, modifications to the MVS system or operations will be proposed. See Section 6.2.

# SECTION SIX

## SECTION SIX. ADDITIONAL DESIGN STUDIES

Additional design studies will be performed as needed to implement the remedy. The current SOW envisions two additional design studies, as follows:

### 6.1 A RISK ASSESSMENT FOR EXPOSURE TO SITE SOILS AND LANDFILL GASES

This section describes the planned evaluation of risks associated with exposure to site soils and landfill gases using realistic potential ***future*** use assumptions. This evaluation will build on the Baseline Risk Assessment (BRA) and the Supplemental Baseline Risk Assessment (SBRA) conducted for the IEL site. The BRA was conducted in 1995 according to USEPA guidelines and was updated in 1999 with the SBRA using revised risk assessment methodologies enacted by the USEPA, revised toxicity criteria, and updated groundwater data collected using low-flow sampling techniques. In general, the BRA and SBRA show no unacceptable threats to human health or the environment for the current exposure pathways; however, because the potential future exposure pathways may change based on future uses. additional exposure pathways will be evaluated in the planned risk assessment.

The Revised Supplemental Baseline Risk Assessment (RSBRA) for the IEL site will be developed, as follows:

1. Identify reasonable future use assumptions associated with a park/nature preserve setting.
2. Evaluate the Methane Venting System data and historic landfill gas monitoring data to identify trends and verify historic sampling of reasonable worst-case conditions.
3. Establish a grid for ambient air sampling program for the landfill, collect ambient air samples and analyze.
4. Revise the SBRA to include new exposure pathways (park/nature preserve) and the ambient air data.
5. If no unacceptable exposures are identified in the RSBRA (that uses the historic RI soils and sediments data and the low-flow groundwater data) then risk-related actions (moving the fence, installing overlooks, etc.) may be considered.
6. If unacceptable exposures are identified, selected additional surface soil, sediment, air, or groundwater sampling and/or modeling may be conducted on those media/parameters that provide the risk drivers.
7. If some additional access is shown to be safe, a sensitivity analysis will be conducted to estimate the boundary conditions that may trigger additional analysis.

Some additional discussion of risk assessment elements follows:

**Data**

- Historic samples were taken during the RI/FS from both surface soils (50 locations) and sub-surface soils (35 locations). Samples were also collected from surface water (8 locations in Metzger's Ditch, 4 on-site ponds, and 9 off-site ponds) and sediments (17 locations, all off-site). Data from these samples were evaluated and used in the BRA, although the RI

concluded that much of the contamination detected in these samples (at least in the soils and sediments) was not attributable to the IEL site.

**Exposure Pathways**

- New remedial actions for the site could allow exposure to site soils and groundwater in ways that differ from those originally evaluated in the BRA and SBRA (the only on-site exposures to soils were to short-term trespassers aged 9-14). The RSBRA should evaluate exposures to on-site recreational users and trespassers that would come into contact with soils and volatile gasses emanating from the landfill during site visits. The exposure pathways would be developed to evaluate both the "normal" recreational receptor (stays on improved trails), and the "trespasser" recreational user (off-road bikers and hikers who venture off the improved trails). These scenarios will also be expanded to include evaluations of both the adult and child receptors.
- The RSBRA will need to expand the volatile gas evaluation conducted in the BRA to include on-site receptors discussed above (includes methane evaluation).

**Exposure Assumptions**

- The BRA and SBRA used the standard USEPA methodology of evaluating the "most likely exposed" (MLE) and "reasonably maximally exposed" (RME) individuals for all exposure pathways. Exposure assumptions were developed using the USEPA's Exposure Factors Handbook. The RSBRA will also use this methodology to evaluate or revise any exposure pathways evaluated under the current future land-use assumptions.

## 6.2 MVS EVALUATION

As part of the additional design studies, the Responding Companies will conduct an evaluation of the need for continued operation of the MVS and propose any needed modifications. A tentative Gas Monitoring Program outline is presented below. This program is designed to:

- Investigate the current flux of methane generation and the current gas composition and parameters that will allow projection of future rates of methane generation.
- Estimate future gas generation rates.
- Evaluate the potential for migration of landfill gases and the migration pathways and fluxes under current and proposed MVS operating frequencies.
- Estimate the amount of through-surface methane release.
- Review historic information on the methane generation at the site, including:
  - An evaluation of the frequency of operation of the current system;
  - An evaluation of the historic methane investigations at the site;
  - A comparison of current/historic generation rates to the Scholl Canyon Gas Generation model-predicted outputs provided by the USEPA Office of Research and Development and Office of Air Quality Planning and Standards. Based on the age of IEL, current methane generation rates should be about 1/3 of the maximum rates produced by the site.
- Assess the current MVS system performance and identify whether the current methane destruction / venting system is adequate.
- Sample subsurface areas of the site that have the potential for migration (eastern boundary).

Once this evaluation is complete, a program for augmentation or phaseout of the MVS will be developed based on the results.

**DRAFT OUTLINE OF THE GAS MONITORING PROGRAM FOR THE IEL SITE:**

1. **INTRODUCTION**
2. **EVALUATION OF EXISTING GAS VENTING SYSTEM**
   - 2.1. Process Description
   - 2.2. Assessment of Current System
     - 2.2.1. Extraction and Monitoring Wells
     - 2.2.2. Piping and Headers
     - 2.2.3. Alarm System
     - 2.2.4. Exhauster Station
     - 2.2.5. Automatic Operation
     - 2.2.6. Manual Operation
   - 2.3. Potential System Modifications
3. **ELEMENTS OF GAS MONITORING PROGRAM**
   - 3.1. Compliance with ARARs
   - 3.2. Operations and Maintenance
     - 3.2.1. Inspection and Frequency
       - 3.2.1.1. Gas Extraction Wells
       - 3.2.1.2. Header Pipes
       - 3.2.1.3. Moisture Traps
       - 3.2.1.4. Gas Monitoring Wells
       - 3.2.1.5. Gas Exhauster
       - 3.2.1.6. Flame Arrestor
       - 3.2.1.7. Ground Flare
       - 3.2.1.8. Valves
       - 3.2.1.9. Propane Generator
   - 3.3. Maintenance
     - 3.3.1. Routine
     - 3.3.2. Non-Routine
   - 3.4. Monitoring
     - 3.4.1. Monitoring Parameters
       - 3.4.1.1. Methane Content
       - 3.4.1.2. Oxygen Content
       - 3.4.1.3. Carbon Dioxide Content
       - 3.4.1.4. Gas Temperature
       - 3.4.1.5. Vacuum/Pressure
       - 3.4.1.6. Valve Settings
       - 3.4.1.7. Flow Rates
       - 3.4.1.8. Ambient Conditions
     - 3.4.2. Monitoring Frequency
       - 3.4.2.1. Routine
       - 3.4.2.2. Troubleshooting/Verification/Assessment

3.4.3. Monitoring Procedures
3.4.3.1. Equipment
3.4.3.2. Reporting
3.4.3.3. Data Validation

**4. LONG TERM GAS VENTING SYSTEM EVALUATION**

4.1. Baseline Study
4.1.1. Estimate of Current Gas Generation Rates/Rebound Study
4.1.2. Characterization of Current Gas Composition
4.1.3. Determination of Potential Future Explosive Gas Formation
4.1.4. Evaluation of Potential Hazard to Occupied Structures
4.1.5. Evaluation of Potential Migration Pathways

4.2. Shut Down of Gas Venting System
4.2.1. Compliance with ARARs
4.2.2. Abandonment of Permanent Monitoring Points
4.2.3. Decommissioning of Active Gas Venting System
4.2.4. Long Term Monitoring
4.2.5. Contingency Plan

## 6.3 ADDITIONAL GAS MIGRATION EVALUATION

As described above and in Appendix 6, migration of landfill gases away from the Site through the subsurface at the eastern boundary and concentrations of landfill gases in ambient air in the interior of the landfill will be evaluated. An investigation work plan will be developed and submitted to USEPA and OhioEPA for review and approval.

## 6.4 DRAFT MVS O&M PLAN

The MVS operations, maintenance, and monitoring program will continue in exactly the same form (detailed in Table 11) until the MVS system evaluation is complete. As a result of the MVS system evaluation, modifications to the MVS system or operations will be proposed and a draft O&M plan will be submitted at that time. See Section 6.2.

## 6.5 WORK PLAN REVISIONS

As needed to implement the remedy and monitoring programs, work plans will be revised. These may include the Site Operations and Maintenance Plan, Sampling and Analysis Plan, Site Specific Health and Safety Plan, and Quality Assurance Project Plan.

# SECTION SEVEN

## SECTION SEVEN. PROJECT COST AND SCHEDULE ESTIMATES

This section includes a revision to the project cost estimate based on the work anticipated in the Remedial Design. It also includes a proposed schedule for implementation.

### 7.1 REMEDY IMPLEMENTATION, CAPITAL COST

A capital cost estimate to implement the remedy is provided in Table 12. This estimate updates the capital cost estimate detailed in the Focused Feasibility Study for the Site, March, 2002, using available information. Detailed below are notes that provide backup for the information presented on the cost estimate.

**Notes/Assumptions Concerning the Updated Capital Cost Estimate for the IEL Remedy:**

1. Capital Costs include all activities expected to be performed through Calendar 2004 with a few additions. Capital costs incurred through Calendar 2004 are considered to be "2003 $$$". The CERCLA 5-year reviews are included with the Capital Costs even though they will not be performed until September 2006 and 2011. The MVS demolition is estimated as occurring in 2012, depending upon monitoring results.
2. Capital costs for the interim action (providing alternate water supply) are included in Year 0 (both in actual dollars and 2003 $$).
3. Tasks 2, 3, and 4 are complete (demolition of Uniontown Tire, Uniontown Station Antiques and warehouse and associated structures).
4. Two new double-cased wells (portion of Task 5) have been installed in 2002.
5. Well installation and abandonment to be complete by July 2004.
6. No fence *relocation* included with estimate.
7. No capital dollars have been set aside for MVS well abandonment. The MVS system will be decommissioned once the monitoring program and the methane study demonstrate that the system can be safely shut down. This shutdown is expected to occur in 2012. The need for additional gas well abandonment will be evaluated once the system has been decommissioned.

### 7.2 REMEDY IMPLEMENTATION, OPERATIONS, MAINTENANCE, AND MONITORING COST

An O&M cost estimate is provided as Table 13. This estimate updates the estimate provided in the Focused Feasibility Study for the Site. The capital and O&M costs are collected and subjected to net present value analysis according to USEPA guidelines. This information is summarized in Table 14.

### 7.3 REMEDY IMPLEMENTATION SCHEDULE

A remedy implementation schedule (capital activities) is presented in Figure 21. It details remedy implementation tasks dating to October 2000 (Pre-demo) through December 2004. Tasks to be conducted post-2004 are included with Operations and Maintenance Activities.

# TABLES

**Table 1. Wildlife Noted During the WHC Visit**

| Type | Common Name | Scientific Name |
|---|---|---|
| Plants | box elder | *Acer negundo* |
| | silver maple | *Acer saccharinum* |
| | milkweed | *Asclepias syriaca* |
| | field mustard | *Brassica rapa* |
| | teasel | *Dipsacus sylvestris* |
| | horsetail | *Equisetum fistulosum* |
| | green ash | *Fraxinus pennsylvanica* |
| | English ivy | *Hedera helix* |
| | rush | *Juncaceae Family* |
| | Eastern red cedar | *Juniperus virginiana* |
| | apple | *Malus sylvestris* |
| | Autumn olive | *Oleaceae Family* |
| | switch grass | *Panicum virgatum* |
| | Phragmites | *Phragmites communis* |
| | phlox | *Polemoniaceae Family* |
| | big-toothed aspen (poplar) | Populus *grandidentata* |
| | black cherry | *Prunus serotina* |
| | scrub oak | *Quercus ilicifolia* |
| | staghorn suma | *Rhus typhina* |
| | common locust | *Robinia pseudoacacia* |
| | raspberry | *Rubus occidentalis* |
| | black willow | *Salix nigra* |
| | little bluestem | *Schizachyrium scoparium* |
| | poison ivy | *Toxicodendron pubescens* |
| | red clover | *Trifolium pratense* |
| | rock elm | *Ulmus thomasii* |
| Birds | red tailed hawk | *Buteo jamaicensis* |
| | cardinal | *Cardinalis cardinalis* |
| | turkey vulture | *Cathartes aura* |
| | chimney swift | *Chaetura pelagica* |
| | American crow | *Corvus brachyrhynchos* |
| | gray catbird | *Dumetella carolinensis* |
| | northern oriole | *Icterus galbula* |
| | American robin | *Turdus migratorius* |
| Reptile | painted turtle | *Chrysemys picta* |
| Mammal | white-tailed deer | *Odocoileus virginianus* |
| | muskrat | *Ondatra zibethica* |
| | red fox | *Vulpes fulva* |
| Amphibian | green frog | *Rana clamitans* |

**Table 2. Native Plants for Wildflower Meadow**

| Type | Common Name | Scientific Name |
|---|---|---|
| Grasses | little bluestem | Andropogon scoparius |
| | broom sedge | Andropogon virginicus |
| | side-oats grama | Bouteloua curtipendula |
| | purple love grass | Eragrostis spectabilis |
| | Indian rice grass | Oryzopsis hymenoides |
| | switch grass | Panicum virgatum |
| Wildflowers | columbine | Aquilegia canadensis |
| | Verbena stricta | Asclepias syriaca |
| | butterfly weed | Asclepias tuberosa |
| | New England aster | Aster novae-angliae |
| | wild indigo | Baptisima tinctoria |
| | purple coneflower | Echinacea purpurea |
| | fireweed | Epilobium angustifolium |
| | saw-toothed sunflower | Helianthus grosseserratus |
| | thyme leaved pinweed | Lechea minor |
| | round-headed bush clover | Lespedeza capitata |
| | cardinal flower | Lobelia cardinalis |
| | wild lupine | Lupinus perennis |
| | wild bergamot | Monarda fistulosa |
| | horsemint | Monarda punctata |
| | common evening primrose | 0enothera biennis |
| | tall cinquefoil | Potentilla arguta |
| | Canada goldenrod | Solidago canadensis |
| | hoary vervain | Verbena stricta |

**Table 3. Native Vegetation for Hedgerows and Forested Islands**

| Type | Common Name | Scientific Name |
|---|---|---|
| Grass | switch grass | Panicum virgatum |
| | needlegrass | Stipa spartea |
| | June grass | Koeleria cristata |
| Shrubs | Jerseytea | Ceanothus americanus |
| | common buttonbush ' | Cephalanthus occidentalis |
| | silky dogwood | Cornus amomum |
| | gray dogwood | Cornus racemosa |
| | American filbert | Corylus americana |
| | shrubby Saint John's wort | Hypericum prolificum |
| | common winterberry flex | verticillata |
| | common spicebush | Lindera benzoin |
| | American black currant | Ribes americanum |
| | Allegany blackberry | Rubus allegheniensis |
| | blackcap raspberry | Rubus occidentalis |
| Trees | box elder | Acer negundo - |
| | black maple | Acer nigrum |
| | red maple | Acer rubrum |
| | common pawpaw | Asimina triloba |
| | bitternut hickory | Carya cordiformis |
| | shagbark hickory | Carya ovata |
| | common hackberry | Celtis occidentalis |
| | frosted hawthorn | Crataegus pruinosa |
| | dotted hawthorn | Crataegus punctata |
| | green ash | Fraxinus pennsylvanica |
| | common witchhazel | hamamelis virginiana |
| | red mulberry | Morus rubra |
| | American plum | Prunus americana |
| | black cherry | Prunus serotina |
| | northern red oak | Quercus borealus |
| | smooth sumac | Rhus glabra |
| | staghorn sumac | Rhus typhina |

**Table 4. Native Vine Species**

| Common Name | Scientific Name |
|---|---|
| common trumpetcreeper | Campis radicans |
| American bittersweet | Celastrus scandens |
| virginsbower | Clematis virginiana |
| common moonseed | menispermum canadense |
| Virginia creeper | Parthenocissus quinquefolia |
| common greenbrier | Smilax rotundifolia |

## Table 5. List of Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considereds (TBCs) for the IEL Site

| ARAR OR TBC | Legal Citation | Classification | Summary of Requirement | Further Detail Regarding ARAR's in the Context of the Remedy |
|---|---|---|---|---|
| **I. CHEMICAL-SPECIFIC** | | | | |
| A. Water | | | | |
| 1. Safe Drinking Water Act | 42 U.S.C.§§ 300f et seq | | | |
| Maximum Contaminant Levels (MCLs) | 40 C.F.R. §§ 141.11-12 and 141.61-62 | Relevant and Appropriate | MCL's are enforceable standards for public drinking water supply systems which have at least 15 service connections or are used by at least 25 persons. These requirements are not directly applicable to IEL because there is no public water supply system using this groundwater. Although there are no plans to use affected groundwater in the vicinity of IEL and the downgradient groundwater is not being used as a potable source, the groundwater is still considered a potential groundwater resource. | MCLs are used for comparison purposes with site groundwater data to help identify any threat or potential threat to human health or the environment. Comparisons to MCLs are very conservative. The Site remedy is protective of human health and the environment under current conditions. Ensuring that this condition persists is a goal of the remedial action. Another goal of the remedial action is to achieve MCLs for all constituents in all wells. |
| 2. Ohio Administrative Code (OAC) governing MCLs for organic and inorganic contaminants of concern | OAC 3745-81-11-(A), (B), & ©, 3745-81-12(A), (B) & (C) | Relevant and Appropriate | 3745-81-11 (A), (B), & (C): Maximum contaminant levels for inorganics; 3745-81-12 (A), (B), & (C): Maximum contaminant levels for organics. | Same as above |
| 3. EPA-developed risk-based preliminary remediation goals (PRGs) | EPA-Region 9 Preliminary Remediation Goals (PRGs) Updated 10/1/99 | To Be Considered | Risk-based tools for evaluating contaminated groundwater. However, no affected groundwater has a completed exposure pathway. Thus, these are not applicable nor relevant and appropriate. | Will be used for comparison purposes in a manner similar to MCLs. |
| **II. ACTION-SPECIFIC** | | | | |
| 1. Monitoring of Landfill | | | | |
| State reqmts for general landfill closure, applicable performance stds. Assocated with landfill closure and post-closure care | OAC 3745-57-10(a) & (B), 3745-55-11(A)-(c) and 3745-55-17(B) | To Be Considered | 3745-27-10(A) & (B): State standards for closure and post-closure care for landfill, incl. Final cover & maintenance; 3745-55-11 (A)-(C); Requires that all haz waste facilities be close in a manner that minmizes need for further maintenance and controls: 3745-55-17(B); Specifies post-closure requirements, incl. maintenance, monitoring, and post-closure use of property. | Landfill properly closed under state law in effect at the time; therefore not applicable. Post closure and monitoring requirements are TBCs. |
| 2. Monitored Natural Attenuton (MNA) | | | | |
| Use of monitored natural attenuation at Superfund, RCRA, Corrective Action, and Underground Storage Tank Sites, April 1999 | OSWER Directive 9200.4-17P | To Be Considered | This policy provides gudiance for evaluating and approving monitored natural attenuation remedies | This policy shall be considered during implementation of chosen remedy for IEL. |

# Table 7. Tier and Sampling Summary, Current Well Network, 2003

| # | Well ID | Tier | Location | Dedicated Pump? | Notes (Well not sampled / reason, comments) |
|---|---|---|---|---|---|
| 1 | MW-01D | LP | ON-SITE | NO | |
| 2 | MW-01I | S | ON-SITE | YES | |
| 3 | MW-01S | LP | ON-SITE | NO | |
| 4 | MW-02D | S | ON-SITE | YES | |
| 5 | MW-02S | LP | ON-SITE | NO | |
| 6 | MW-03D | LP | ON-SITE | NO | |
| 7 | MW-03I | LP | ON-SITE | NO | |
| 8 | MW-03S | LP | ON-SITE | NO | |
| 9 | MW-04S | LP | OFF-SITE | NO | |
| 10 | MW-05S | LP | OFF-SITE | NO | |
| 11 | MW-06S | LP | OFF-SITE | NO | |
| 12 | MW-07D | LP | ON-SITE | NO | |
| 13 | MW-07I | S | ON-SITE | YES | |
| 14 | MW-07S | OW | ON-SITE | YES | |
| 15 | MW-09D | LP | ON-SITE | NO | |
| 16 | MW-09I | LP | ON-SITE | NO | |
| 17 | MW-09S | LP | ON-SITE | NO | |
| 18 | MW-10D | LP | OFF-SITE | NO | |
| 19 | MW-10I | LP | OFF-SITE | YES | |
| 20 | MW-10S | D | OFF-SITE | YES | |
| 21 | MW-11D | LP | ON-SITE | NO | |
| 22 | MW-11I | S | ON-SITE | YES | |
| 23 | MW-11S | LP | ON-SITE | NO | |
| 24 | MW-12D | B | OFF-SITE | YES | |
| 25 | MW-12I | B | OFF-SITE | YES | |
| 26 | MW-13S | OW | ON-SITE | NO | |
| 27 | MW-13I | OW/A4 | ON-SITE | NO | |
| 28 | MW-13iNew | OW/A4 | ON-SITE | YES | Replacement well installed, 2002 |
| 29 | MW-14iNew | OW/A4 | ON-SITE | YES | Replacement well installed, 2002 |
| 30 | MW-14I | OW/A4 | ON-SITE | NO | |
| 31 | MW-14S | OW | ON-SITE | YES | |
| 32 | MW-15I | OW | ON-SITE | NO | |
| 33 | MW-15S | OW | ON-SITE | YES | |
| 34 | MW-16I | OW | ON-SITE | YES | |
| 35 | MW-17D | OW | ON-SITE | YES | |
| 36 | MW-17S | OW | ON-SITE | YES | |
| 37 | MW-18I | LP | ON-SITE | NO | |
| 38 | MW-18S | S | ON-SITE | YES | |
| 39 | MW-19S | D | OFF-SITE | YES | |
| 40 | MW-20D | LP | OFF-SITE | NO | |
| 41 | MW-20I | LP | OFF-SITE | YES | |
| 42 | MW-20S | B | OFF-SITE | YES | |
| 43 | MW-21I | LP | ON-SITE | NO | |
| 44 | MW-21S | S | ON-SITE | YES | |
| 45 | MW-22I | S | ON-SITE | YES | |
| 46 | MW-23D | LP | OFF-SITE | NO | |
| 47 | MW-23I | LP | OFF-SITE | NO | |
| 48 | MW-23S | D | OFF-SITE | YES | |
| 49 | MW-24I | LP | OFF-SITE | YES | |
| 50 | MW-24S | D | OFF-SITE | NO | |
| 51 | MW-25I | LP | OFF-SITE | YES | |
| 52 | MW-25S | D | OFF-SITE | NO | |
| 53 | MW-26I | LP | OFF-SITE | YES | |
| 54 | MW-26S | D | OFF-SITE | NO | |
| 55 | MW-27D | LP | OFF-SITE | NO | |
| 56 | MW-27I | LP | OFF-SITE | NO | |
| 57 | MW-27S | D | OFF-SITE | YES | |
| 58 | MW-28D | LP | OFF-SITE | NO | |

Key: * All wells were sampled using a low-flow pump

Tier: Well designations established w/draft contingency plan

Tier S: Sentinel Wells

LP: Low Priority Wells

OW: On-Site Wells

B: Background Wells

D: Downgradient Wells

Tier A4 are on-site wells the Township requested be sampled 11/02

Dedicated Pump: 27 wells have dedicated pumps; other wells can be successfully sampled (except where noted) using portable, low-flow pumps

**Table 6. List of Monitoring Wells Whose Elevations are Representative of the Uppermost Groundwater Unit at IEL**

| Well ID | Screened Elevation | Comment | Well ID | Screened Elevation | Comment |
|---|---|---|---|---|---|
| 1I | 1081'-1086' | 1S is perched | 17S | 1112'-1122' | Water@same as 17D |
| 2D | 1070'-1080' | 2S is dry | 18I | 1052'-1062' | 18S is perched |
| 3I | 1086'-1091' | 3S is dry | 19S | 1076'-1086' | There is no 19I |
| 7I | 1088'-1098' | 7S completed in waste | 20S | 1088'-1098' | Completion beneath muck |
| 9I | 1076'-1081' | 9S, 4S, 5S, 6S, in muck | 21S | 1085'-1095' | ~ same elevation as 11I |
| 10S | 1105'-1115' | Evaluate against 10i | 22I | 1055'-1065' | There is no 22S |
| 11I | 1081'-1086' | 11S is perched | 23S | 1100'-1110' | |
| 12I | 1074'-1084' | There is no 12S | 24I | 1080'-1090' | Screened 1080-1090 |
| 13I | 1042'-1052' | 13S is dry | 25S | 1101'-1111' | |
| 14I | 1056'-1066' | 14S is perched | 26S | 1055'-1065' | |
| 15S | 1108'-1118' | ~ same as 15I | 27S | 1109'-1119' | |
| 16I | 1071'-1081' | There is no 16S | | 934'-944' | 28D screened in bedrock |

From: *SUMMARY REPORT on an Assessment of Individual Groundwater Monitoring Wells at the Industrial Excess Landfill (IEL) Site and the Regional Hydrogeologic Setting, December 12, 2000. (Amended August 2003).*

## Table 5. List of Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considereds (TBCs) for the IEL Site

| ARAR OR TBC | Legal Citation | Classification | Summary of Requirement | Further Detail Regarding ARAR's in the Context of the Remedy |
|---|---|---|---|---|
| 3. Stormwater Discharge | | | | |
| NPDES Stormwater Discharge Requirements | 40 C.F.R. 122.26(a) | Applicable | Stormwater discharge requirements under the NPDES program. | NPDES permits are required for discharges, which the regulation defines to include landfills that have received industrail wastes. However, because of the CERCLA § 121 (e) permit exemption, only substantive requirements of the NPDES regulations are applicable. |
| 4. Landfill Gas Management | | | | |
| Stack height requirements | OAC 3745-16-02(B) and (C) | Applicable | Establishes allowable stack height for air emission sources based on good engineering practice | This provision is applicable to any stack at IEL (e.g., MVS) |
| Particulate non-degradation policy | OAC 3745-17-05 | Applicable | Degradation of air quality is prohibitied in any area where air quality is better than required by 3745-17-02 (non degradation policy). | Pertains to stack emissions from methane venting system. |
| Organic emissions control from stationary sources. | OAC 3745-21-07(A),(B), (G), (I), and (J) | Applicable | Requires control of emissions from stationary sources. Requires best available technology | Pertains to emissions from MVS. |
| Carbon monoxide (CO) control from stationary sources. | OAC 3745-21-08(A) through (E) | Applicable | Requires any stationary source of CO to minimize emissions using best available control technologies and operating practices. | Pertains to emissions from venting system which is expected to emit carbon monoxide. |
| Standards for total suspended particuates. | OAC 3745-17-02(A), (B), and (C) | Applicable | Establishes specific standards for total suspends particulates. | Revelant to stack emissions from MVS and construction activities. |
| 5. Remedy Construction Activities | | | | |
| Worker Safety | 29 C.F.R. 1910.120 | Applicable | Establishes proper training and personal protection requirements for workers who have reasonable potential to be exposed to hazardous substances while performing job fuctions at the site. | Workers shall be proprly trained and shall wear appropriate personal protection equipment for activities conducted at the IEL Site. |
| State rules governing grading, excavating, etc. at sites containing hazardous or solid wastes | ORC 3734.02(H) | Relevant and Appropriate | Prohibition againist filling, grading, excavation, building, drilling, or mining on land where a hazardous or solid waste facility was operated, without prior authorization from OEPA. | OEPA in included in decision-making process. |
| State prohibitions on certain air emissions from a hazardous waste faciltiy. | ORC 3734.02(I) | Relevant and Appropriate | No hazardous waste facility shall emit any particulate matter, dust, fumes, gas, mist, smoke, vapor, or odorous substance that interferes with the comfortable enjoyment of life or property or its injurious to public | IEL is not a hazardous waste facility. However, to the extent that air emissions may occur, this may be relevant and appropriate.. |
| Fugitive dust control. | ORC 3745-17-08 | Applicable | Emissions of fugitive dust shall be controlled at sites where it may be generated due to grading, loading, | Pertains to clearing, grubbing, and related construction operations |

## Table 5. List of Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considereds (TBCs) for the IEL Site

| ARAR OR TBC | Legal Citation | Classification | Summary of Requirement | Further Detail Regarding ARAR's in the Context of the Remedy |
|---|---|---|---|---|
| Standards for total suspended particulates. | OAC 3745-17-02(A), (B), and (C) | Applicable (to construction acttivities) | Estabishes specific standards for total suspended particulates. | Relevant for stack emissions from+E10 methane venting system and construction activities. |
| Nuisance control/prohibition | OAC 3745-15-07(A) | Applicable | Defines air pollution nuisance as the emission or escape into the air from any source(s) of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors, and combinations of the above that endanger the health, safety, or welfare of the public or cause personal injury or property damage, such nuisances are prohibited. | Applies to activities that may cause nuisances, such as excavation, cap construction, demolition of buildings, etc. |
| 5. Well Abandonment | | | | |
| State requirements for well abandonment | OAC 3745-9-10 | Applicable | State requirements for well abandonment | Obsolete wells will be abandoned in accordance with State standards |
| **III. LOCATION-SPECIFIC** | | | | |
| Hazardous Waste Facilities and Old Landfills | | | | |
| Monitoring for explosive gases at sanitary landfills. | OAC 3745-27-12(A), (B), (D), (E), (M), and (N) | Substantive Provisions are Applicable | Monitoring requirements for explosive gases at sanitary landfills | This requirement will be covered under long-term monitoring plan for this site |
| Requirements for non-methane organic compound (NMOC) emissions at old landfill sites. | OAC 3745-76 | Relevant and Appropriate | Establishes standards for the control of NMOC emissions from old landfill sites. Covers definition, test methods, performance standards, and recorkeeping requirements. | IEL gas treatment system must meet these standards before operating in a passive mode. |
| State prohibitions on certain air emissions from a hazardous waste facility. | ORC 3734.02(I) | Relevant and Appropriate | No hazardous waste facility shall emit any particulate matter, dust, fumes, gas, mist, smoke, vapor, or odorous substance that interferes with the comfortable enjoyment of life or property or is injurous to public health. | IEL may not be a hazardous waste facility under ORC. |
| Prohibition of nuisances | ORC 3767.13(A) | Relevant and Appropriate | Prohibits noxious exhalations or smells. | Pertains to any site that may have noxious smells. |
| OAC regulations govering groundwater protection. | OAC 3745-54-90 et seq | To be Considered | Requires landfill permits to include standards that ensure protection of groundwater. Substantive requirements only. | Under CERCLA § 12 121 (e)(1), no permit is required at IEL. But in order to protect groundwater, substantive permit standards will be considered in designing the IEL monitoring program. |

**TABLE 8. Inventory of IEL Monitoring Wells**
**And Recommendations for their Disposition**

Legend:

Historic well designations:

S = shallow completion depth
i = intermediate completion depth
D = deep completion depth

Clean – no contaminants detected for X# of years
RED – retained existing monitor wells
Blue – retained contingency monitor wells
*NEW* – replacement wells and new well locations

| Well Identification | Proposed Fate | Rationale |
|---|---|---|
| MW-1i | Retain | Representative of uppermost continuous groundwater unit. Downgradient well location. VOC detect 3/97. |
| MW-1D | Retain | Retain as a contingency well. Not representative of the uppermost continuous groundwater unit. Clean +14 yrs. |
| MW-1S | Retain | Sentinel well. Perched aquifer completion, straddles water table. Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-2D | Abandon | Not representative of uppermost continuous groundwater unit, bedrock completion. Clean +10 yrs. |
| MW-2S | Abandon | Dry since 1988. Reflects prior perched aquifer. |
| MW-3i | Retain | Representative of uppermost continuous groundwater unit. Perimeter location. Clean +5 yrs. |
| MW-3D | Abandon | Not as representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-3S | Abandon | Dominantly dry. Reflects perched aquifer. Clean +10 yrs. |
| MW-4S | Abandon | Completed in Carlisle Muck. Perched upgradient aquifer. |
| MW-5S | Abandon | Completed in Carlisle Muck. Perched upgradient aquifer. |
| MW-6S | Abandon | Completed in Carlisle Muck. Perched upgradient aquifer. |
| MW-7i | Retain | Representative of uppermost continuous groundwater unit. Perimeter well. Clean +10 yrs. |
| MW-7D | Retain | Retain as a contingency well. Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-7S | Abandon | Completed partially within waste and the Carlisle Muck. |

| | | |
|---|---|---|
| MW-9i | Retain | Contingency well. Representative of uppermost continuous groundwater unit. Upgradient. Clean +10 yrs. |
| MW-9D | Abandon | Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-9S | Abandon | Completed in Carlisle Muck. Perched upgradient aquifer. |
| MW-10i | Retain | Representative of uppermost continuous groundwater unit. Clean +10 yrs. Perimeter well. |
| MW-10D | Abandon | Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-10S | Abandon | Representative of uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-11i | Retain | Representative of uppermost continuous groundwater unit. Downgradient location. Current analyses detect contaminants. |
| MW-11D | Retain | Retain as a contingency well. Representative of uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-11S | Retain | Sentinel well. Perched aquifer completion. Not representative of the uppermost continuous groundwater unit. Single detection of Toluene at 1.3 ppb in 12/00. |
| MW-12i | Retain | Representative of uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-12D | Abandon | Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-13i | Abandon | Broken. |
| MW-13S | Abandon | Perched aquifer completion. Not representative of the uppermost continuous groundwater unit. Very high detection limits. |
| MW-13NEW | Retain | New replacement well for MW13I (broken) |
| MW-14i | Abandon | Broken. |
| MW-14S | Abandon | Single cased well within landfill. Not representative of the uppermost continuous groundwater unit. Very high detection limits. |
| MW-14NEW | Retain | New replacement well for MW14I (broken) |
| MW-15i | Abandon | Single cased well within landfill. |
| MW-15S | Abandon | Single cased well within landfill Not as representative of the uppermost continuous groundwater unit. Very high detection limits. |
| MW-16i | Abandon | Representative of uppermost continuous groundwater unit. Upgradient well location. Clean +12 yrs. Single cased well within landfill. Replace with MW16 NEW at perimeter. |

| | | |
|---|---|---|
| MW-17D | Abandon | Single cased well within landfill. Not representative of the uppermost continuous groundwater unit. Replace with MW17New further upgradient. |
| MW-17S | Abandon | Single cased well within landfill. Not representative of the uppermost continuous groundwater unit. Replace with MW17New at perimeter |
| MW-18i | Retain | Perimeter well. Representative of uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-18S | Retain | Perimeter well. Clean +10 yrs. |
| MW-19S | Abandon | Not as representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-20i | Abandon | Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-20D | Abandon | Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-20S | Retain | Upgradient monitor well representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-21i | Retain | Retain as a contingency well. Downgradient monitor well representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-21S | Retain | Contaminated shallow sentinel well. |
| MW-22i | Retain | Representative of the uppermost continuous groundwater unit. Clean +10 yrs. Perimeter well. |
| MW23i | Abandon | Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-23D | Abandon | Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-23S | Retain | Completed partially within the Carlisle Muck. |
| MW-24i | Retain | Downgradient monitor well representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-24S | Abandon | Clean +10 yrs. |
| MW-25i | Abandon | Clean +10 yrs. Upgradient well. |
| MW-25S | Retain | Downgradient monitor well representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-26i | Abandon | Not representative of the uppermost continuous groundwater unit. Clean +10 yrs. |

| | | |
|---|---|---|
| MW-26S | Retain | Downgradient monitor well more representative of the uppermost continuous groundwater unit. Clean +10 yrs. |
| MW-27i | Retain | Downgradient well. Clean +5 yrs. Trace of VOCs in Mar. 1997. |
| MW-27D | Abandon | Clean +10 yrs. |
| MW-27S | Abandon | Clean +10 yrs. |
| MW-28D | Abandon | Clean +10 yrs. |

**Table 8 Con't.**
**Replacement and New Well Recommendations**

| | | |
|---|---|---|
| *MW-16 NEW* | Proposed Location | Replacement perimeter well. |
| *MW-17 NEW* | Proposed Location | Replacement well for the MW-17 series. Will be installed beyond the limit of waste. |
| *MW-29* | Proposed Location | New downgradient sentinel well located west of wells 13, 14, and 15. |
| *MW-30* | Proposed Location | New off site/background monitoring well. Located east of sod farm or within the new housing development, depending upon access issues. |
| *MW-31* | Proposed Location | New downgradient sentinel well. |

**Post-2003 Monitoring Well Network:**

2 replacement perimeter wells (MW-16 NEW & MW-17 New)
1 proposed background well (MW-30)
2 proposed sentinel wells (MW-29 & MW-31)
19 retained monitoring wells
+6 contingency wells
30 total wells

# Table 9. Tier Summary, Post-2003

| # | Well ID | Tier | Location | Dedicated Pump? | Notes |
|---|---|---|---|---|---|
| 1 | MW-01I | Sentinel | ON-SITE | **YES** | |
| 2 | MW-01D | Contingency | ON-SITE | **YES** | Deep well on western boundary |
| 3 | MW-01S | Sentinel | ON-SITE | **YES** | Shallow well (straddles water table) |
| 4 | MW-03I | Perimeter | ON-SITE | **YES** | |
| 5 | MW-07I | Sentinel | ON-SITE | **YES** | |
| 6 | MW-07D | Contingency | ON-SITE | **YES** | Deep well on southern boundary |
| 7 | MW-09I | Contingency | ON-SITE | **YES** | Extra background well |
| 8 | MW-10I | Perimeter | OFF-SITE | **YES** | |
| 9 | MW-11I | Sentinel | ON-SITE | **YES** | |
| 10 | MW-11D | Contingency | ON-SITE | **YES** | Deep well on western boundary |
| 11 | MW-11S | Sentinel | ON-SITE | **YES** | Shallow well (straddles water table) |
| 12 | MW-12I | Background | OFF-SITE | **YES** | |
| 13 | MW-13i New | On-Site | ON-SITE | **YES** | replacement well, 2002 |
| 14 | MW-14i New | On-Site | ON-SITE | **YES** | replacement well, 2002 |
| 15 | MW-16 New | Perimeter/New | ON-SITE | **YES** | replacement well, outside waste |
| 16 | MW-17 New | Perimeter/New | ON-SITE | **YES** | replacement well, outside waste |
| 17 | MW-18S | Perimeter | ON-SITE | **YES** | |
| 18 | MW-18I | Perimeter | ON-SITE | **YES** | |
| 19 | MW-20S | Contingency | OFF-SITE | **YES** | Extra background well |
| 20 | MW-21S | Sentinel | ON-SITE | **YES** | |
| 21 | MW-21I | Contingency | ON-SITE | **YES** | Deep well on western boundary |
| 22 | MW-22I | Perimeter | ON-SITE | **YES** | |
| 23 | MW-23S | Perimeter | OFF-SITE | **YES** | |
| 24 | MW-24I | Downgradient | OFF-SITE | **YES** | |
| 25 | MW-25S | Downgradient | OFF-SITE | **YES** | |
| 26 | MW-26S | Downgradient | OFF-SITE | **YES** | |
| 27 | MW-27I | Downgradient | OFF-SITE | **YES** | |
| 28 | MW-29 New | Sentinel/New | ON-SITE | **YES** | new sentinel well |
| 29 | MW-30 New | Background/New | OFF-SITE | **YES** | new background well |
| 30 | MW-31 New | Sentinel/New | ON-SITE | **YES** | new sentinel well |

**Tier Summary**

| Tier Designation | Well Description | Monitoring Purpose / Approach |
|---|---|---|
| **Sentinel Wells: 8 wells:** 1s, 1i, 7i, 21s, 11s, 11i, 29, 31 | Located along western boundary of landfill | Will detect migration downgradient from landfill if it occurs |
| **On-Site Wells: 2 wells:** 13i and 14i | Double-cased new wells installed through waste | Provide early indications of migration from landfill contents |
| **Background: 2 wells:** 12i, 30 | Upgradient. | Identify regional changes; monitor naturally-occurring constituents |
| **Perimeter Wells: 7 Wells:** 3i, 18i, 18s, 22i, 16, 17, 23s | Along landfill perimeter but cross-gradient | Provide coverage of uppermost aquifer in all compass directions |
| **Downgradient Wells: 5** 24i, 25s, 26s, 27i, 10i | Further downgradient than sentinel wells | Allow measurement of extent should sentinel wells show detects |
| **Contingency Wells: 6** 9i, 1d, 20s, 11d, 21i, 7d | Western/southern boundary wells retained | Sampled only if results in 1i, 11i, 21s, 7i, and 30 warrant |
| **New Wells: 5** 16, 17, 29, 30, 31 | Replacement: 16, 17<br>Background: 30<br>Sentinel 29, 31 | Northside boundary coverage<br>Better Sentinel well coverage<br>Better background location |

# Table 10. Proposed 30-year IEL Sampling Event Matrix

*as of 9/22/2003*

Notes: Seven monitoring events conducted prior to August 2000. Remedy "in-place" since 1980
Regular monitoring using modern techniques conducted beginning in August 2000; I.e. year one through year three has already been completed under an agreement with the Township under the supervision of USEPA and OhioEPA.
Assume new monitoring wells installed before August 2004 event

| Monitoring Year | Years Post ROD | Event # | Date | Monitoring Well Tiers to be Sampled | Analytical Parameters | Rationale |
|---|---|---|---|---|---|---|
| Year One | | 1 | August-2000 | All Tiers | VOCs, Metals, Nat'l, RAD | Supplement the historic database; charaterize seasonal variation; montor natural attenuation processes and chemical constituents on-site; monitor for potential off-site impacts via sentinel wells; put RAD issue to bed, |
| | | 2 | November-2000 | All Tiers; Tier A1** only for RAD | VOCs, Metals, Nat'l, RAD | |
| | | 3 | February-2001 | Tier S, B, OW; Tier A1 only for RAD | VOCs, Metals, Nat'l, RAD | |
| | | 4 | May-2001 | Tier S, B, OW; Tier A1 only for RAD | VOCs, Metals, Nat'l, RAD | |
| Year Two | | 5 | August-2001 | Tier S, B, OW; | VOCs, Metals, Nat'l | Monitor that no off-site migration of landfill constituents is occurring; monitor on-site conditions |
| | | 6 | May-2002 | Tier S, B, OW | VOCs, Metals, Nat'l | |
| | | 7 | July-2002 | All Tiers | VOCs, SVOCs, Metals, Nat'l | All Tiers/Parameters to complete characterization |
| Year Three | | 8 | November-2002 | Tier S, B | VOCs, Metals | Monitor that no off-site migration of landfill constituents is occurring. Snapshot of on-site conditions |
| | | 9 | March-2003 | Tier S, B, OW | VOCs | |
| | | 10 | July-2003 | All Tiers | VOCs, Nat'l | All Tiers to supplement database and confirm nat'l |
| | | | | **REMEDIAL ACTION APPROVED** | | |
| ***2003 Year Four*** | 0 | 11 | November-2003 | All Tiers | VOCs | |
| | | 12 | February-2004 | All Tiers | VOCs | |
| | | 13 | May-2004 | All Tiers+G11 | VOCs | |
| | | 14 | August-2004 | All Wells | VOCs, SVOCs, Metals, Nat'l | |
| Year Five | 1 | 15 | February-2005 | Sentinel, On-Site | VOCs | Number of sampled wells reduced as long as results warrant. |
| | | 16 | August-2005 | Sentinel, On-Site | VOCs | |
| Year Six | 2 | 17 | November-2005 | Sentinel, On-Site | VOCs | |
| | | 18 | May-2006 | All Tiers | VOCs, SVOCs, Metals, Nat'l | |
| Year Six | | | September-2006 | **CERCLA 5-YEAR REVIEW** | | Previous 5-year Review in 2001 |
| Year Seven | 3 | 19 | August-2007 | All Tiers | VOCs | Planned Annual Sampling of all wells for all parameters unless superseded by agreement |
| Year Eight | 4 | 20 | May-2008 | All Tiers | VOCs | |
| Year Nine | 5 | 21 | February-2009 | All Tiers | VOCs | |
| Year Ten | 6 | 22 | November-2010 | All Tiers | VOCs | |
| Year Eleven | 7 | 23 | May-2011 | All Tiers | VOCs, SVOCs, Metals, Nat'l | |
| Year Eleven | | | September-2011 | **CERCLA 5-YEAR REVIEW** | | Previous 5-year Review in 2006 |
| Years 12-33 | 30 | 24-34 | 2012-2033 | All Tiers | VOCs, SVOCs, Metals, Nat'l | Biannual sampling of all wells/paramters unless superseded by agreement. |

*24* *Total Number of Events, post-ROD*

***34*** ***Total Number of Events, post August 2000***

Table 11. Summary of Existing MVS Operations and Maintenance Activities

| Task No. | Task | Monitoring Frequency |
|---|---|---|
| 1 | **Inspection Extraction Wells** | |
| | Check handholes for breakage | Monthly |
| | Check handholes for settlement and reset as required | Monthly |
| | Check butterfly valves for breakage and workability | Monthly |
| | Chech sample parts for leakage, breakage, and workability | Monthly |
| 2 | **Inspect Header Pipe** | |
| | Check surface for settlement | Monthly |
| | Check above ground pipe for drainage or leakage | Monthly |
| 3 | **Inspect Moisture Traps** | |
| | Check handholes for breakage | Monthly |
| | Check handholes for settlement | Monthly |
| 4 | **Inspect Landfill Gas Sensor Monitoring Wells** | |
| | Check steel casing for breakage | Monthly |
| | Check steel casing for settlement and reset as required | Monthly |
| 5 | **Inspect Exhauster** | |
| | Coupling alignment | Weekly |
| | Lubricate bearings | Every 300 hrs of operation |
| | Clean lubrication resevoir | Annually |
| | Check exhauster motor | Annually |
| | Check voltage, frequency, and power | Annually |
| | Check for localized heating | Every 500 hrs |
| | Lubricate bearings | Every 500 hrs |
| | Drain exhuaster condensate | As necessary |
| 6 | **Inspect (visually) the Flame Bank of the Flame Arrestor** | |
| | Check and clean as needed | Weekly |
| 7 | **Ground Flare (recorder may be removed from service)** | |
| | Inspect chart paper of temperature recorder | Every 6 Months |
| | Calibrate temperature recorder | Every 6 Months |
| 8 | **Inspect Valves** | |
| | Turn all valves through all positions to prevent "freezing" | Every 6 Months |
| | Check above grade connections for tightness | Annually |
| | deterioration | Every 6 Months |
| | dirt | Every 6 Months |
| 9 | **Service Propane Generator (ie: Oil and Filter Change)** | Annually |
| 10 | **System Monitoring of Extraction System** | Monthly |
| 11 | **Mow Grass** | |
| | areas | 4 Times Annually |
| 12 | **Snow Plowing** | |
| | 4"minimum, monitor snow plow for well protection | 5 Times Annually |

# Table 12. Capital Cost Estimate for the IEL Remedy

| Task Description | Quantity | Unit | Unit Cost ($) | Total ($) | Comments/assumptions |
|---|---|---|---|---|---|
| Provide Funding for Alternate Water Supply | 1 | LS | $1,347,720 | $1,347,720 | Paid 1989 = $3,473,505 (2003 $$) |
| Detailed Design Submittals through Approval | 1 | LS | $75,000 | $75,000 | As needed, complete 9/30/03? |
| 1. Mobilization / Demobilization | 1 | LS | $12,000 | $12,000 | for capital improvements year 1/2 |
| Revise Work Plans, through approval | 1 | LS | $75,000 | $75,000 | As needed |
| 2. Pre-Demo, characterize/dispose IDW, incl. geophysics | 1 | LS | $206,000 | $206,000 | Done 2000 / 2001 |
| 3. Demolish Buildings Along Cleveland Avenue | | | | | |
| Prepare plans through approval process | 1 | LS | $102,000 | $102,000 | Completed 5/01 |
| Properly abandon 8 USTs | 1 | LS | $109,000 | $109,000 | Completed 6/01 |
| Properly abandon 2 monitoring wells and 2 septic | 1 | LS | $21,000 | $21,000 | Completed 7/01 |
| Demolish 3 buildings and dispose of waste | 1 | LS | $213,000 | $213,000 | Completed 7/01 |
| Regrade and revegetate | 1 | LS | $5,000 | $5,000 | Completed 7/01 |
| 4. Remove debris from site and dispose | 1 | LS | incl. w/6 below | | Done 7/01; remainder incl. w/6 |
| 5. Re-work monitoring well network | | | | | |
| Install new / replacement wells on-site, double case | 2 | ea. | $50,000 | $100,000 | Completed in 2002 |
| Install new, single-cased wells | 5 | ea. | $10,000 | $50,000 | |
| Properly abandon on-site monitoring wells | 10 | ea. | $19,000 | $190,000 | 10 MW through waste |
| Properly abandon off-site monitoring / observation wells | 29 | ea. | $13,000 | $377,000 | 23 MW + 6 OW |
| Properly abandon MVS, when necessary | 1 | LS | $50,000 | $50,000 | |
| 6. Enhanced Vegetative Cover and Wildlife Mgt. Improvements | | | | | |
| To be conducted by consortium in conjunction with CAG and WHC | 1 | LS | $450,000 | $450,000 | Includes hardwoods outside fence |
| 8. Additional Studies | 1 | LS | | | |
| Restore fencing and signage | 1 | LS | $10,000 | $10,000 | ~300' fence, 4 signs, tree removal |
| Methane study | 1 | LS | $47,000 | $47,000 | |
| Future Use Risk Assessment | 1 | LS | $75,000 | $75,000 | |
| CERCLA 5-year review (Calendar 2006 and 2011) | 2 | LS | $100,000 | $200,000 | to be done in 2006, 2011, blended |
| Subtotal | | | | $3,714,720 | $6,484,905 |
| Less already Completed Items | | | $2,103,720 | $1,611,000 | in 2003 dollars |
| Engineering / Project Management @ 15% of remaining | | | | $ 241,650 | |
| Contingency @ 25% of remaining items | | | | $ 402,750 | Remaining Items Cost |
| Total | | | | $ 4,359,120 | $2,255,400 |

# Table 14. Summary of Net Present Value (NPV) Analysis

Industrial Excess Landfill (IEL) Superfund Site Remedy Implementation

| Year Post-remedy | Capital Cost 2003 $$ | O&M Cost 2003 $$ | Total Cost w/ (+3.5%/yr COLA) | NPV Discount Factor (7%) | Present Worth |
|---|---|---|---|---|---|
| | | | | | |
| 0 | $6,234,905 | $670,000 | $6,904,905 | 1 | $6,904,905 |
| 1 | | $131,246 | $135,840 | 0.935 | $126,953 |
| 2 | | $131,246 | $140,594 | 0.873 | $122,800 |
| 3 | $100,000 | $131,246 | $256,387 | 0.816 | $209,288 |
| 4 | 5-year review | $149,330 | $171,360 | 0.763 | $130,729 |
| 5 | | $149,330 | $177,357 | 0.713 | $126,453 |
| 6 | | $149,330 | $183,565 | 0.666 | $122,317 |
| 7 | | $149,330 | $189,989 | 0.623 | $118,316 |
| 8 | | $149,330 | $328,320 | 0.582 | $191,085 |
| 9 | | $50,690 | $69,085 | 0.544 | $37,578 |
| 10 | 5-year review | $50,690 | $71,503 | 0.508 | $36,349 |
| 11 | $100,000 | $50,690 | $220,003 | 0.475 | $104,522 |
| 12 | $50,000 | $50,690 | $152,150 | 0.444 | $67,556 |
| 13 | MVS demo | $50,690 | $79,277 | 0.415 | $32,897 |
| 14 | | $50,690 | $82,052 | 0.388 | $31,821 |
| 15 | | $50,690 | $84,923 | 0.362 | $30,780 |
| 16 | | $50,690 | $87,896 | 0.339 | $29,773 |
| 17 | | $50,690 | $90,972 | 0.317 | $28,799 |
| 18 | | $50,690 | $94,156 | 0.296 | $27,857 |
| 19 | | $50,690 | $97,452 | 0.277 | $26,946 |
| 20 | | $50,690 | $100,862 | 0.258 | $26,065 |
| 21 | | $50,690 | $104,393 | 0.242 | $25,212 |
| 22 | | $50,690 | $108,046 | 0.226 | $24,387 |
| 23 | | $50,690 | $111,828 | 0.211 | $23,590 |
| 24 | | $50,690 | $115,742 | 0.197 | $22,818 |
| 25 | | $50,690 | $119,793 | 0.184 | $22,072 |
| 26 | | $50,690 | $123,986 | 0.172 | $21,350 |
| 27 | | $50,690 | $128,325 | 0.161 | $20,651 |
| 28 | | $50,690 | $132,817 | 0.150 | $19,976 |
| 29 | | $50,690 | $137,465 | 0.141 | $19,322 |
| 30 | | $50,690 | $142,276 | 0.131 | $18,690 |
| Total | $6,484,905 | $2,925,568 | $10,943,317 | Total $$, NPV | **$8,751,860** |

Notes:

O&M: Operations and Maintenance

COLA: Cost of Living Adjustment (Price Inflation, 3.5% per year)

LS Lump Sum

# Table 13. Cost Estimate For Operation, Maintenance, and Monitoring

| Task Description | Quantity | Unit | Unit Cost ($) | Total ($) | Per Year Cost | Comments/assumptions |
|---|---|---|---|---|---|---|
| 1. Groundwater Monitoring and O&M years 1-6: | | | | | | August 2000 - July 2008 |
| GW monitoring, Township, Years 1-3 | 10 | Events | $67,000 | $670,000 | $223,333 | Blended rate for completed sampling |
| Operation of MVS Plant, Years 4-6 | 3 | Years | $85,000 | $255,000 | | |
| Site rotational mowing, fence repair, site inspections; habitat restorations / upgrades; | 3 | Years | included | | | |
| Groundwater monitoring, Years 4-6 | 8 | Events | $28,000 | $224,000 | N/A | |
| Total (for Years 4-6) | | | | $479,000 | $95,800 | |
| | | | | | $11,496 | Engineering/project Mgt. @12% |
| | | | | | $23,950 | Contingency @ 25% |
| | | | | | $131,246 | Per year total years 4-6 |
| | | | | | | |
| 2. Groundwater Monitoring and O&M years 7-11: | | | | | | |
| Operation of MVS years 7-11: site mowing, fence repair, site inspections, habitat restoration, etc. decommissioning of MVS assumed in year 11 | 5 | LS | $85,000 | $425,000 | $116,450 | Per-year cost includes engineering@12% contingeny @25% |
| Groundwater monitoring, Years 7-11 | 5 | Events | $24,000 | $120,000 | N/A | |
| Total (for Years 7-11) | | | | $545,000 | $109,000 | |
| Assumes annual sampling | | | | | $13,080 | Engineering/project Mgt. @12% |
| all wells, all parameters | | | | | $27,250 | Contingency @ 25% |
| | | | | | $149,330 | Average over 5 years |
| | | | | | | Demo in year 12 at ~$50,000 |
| | | | | | | |
| 3. Groundwater Monitoring and O&M, Years 12-33 | | | | | | |
| Site mowing, fence repair, site inspections, habitat restoration, etc. | 22 | Years | $25,000 | $550,000 | $34,250 | Per-year cost includes engineering @12% contingeny @25% |
| Groundwater monitoring, Years 12-33 | 11 | Events | $24,000 | $264,000 | N/A | |
| Total (for Years 11-33) | | | | $814,000 | $37,000 | |
| Assumed average of biannual sampling | | | | | $4,440 | Engineering/project Mgt. @12% |
| Actual frequency to be determined | | | | | $9,250 | Contingency @ 25% |
| | | | | | $50,690 | Total per year |

| | | | | | |
|---|---|---|---|---|---|
| Subtotal | | | $ 2,508,000 | | |
| Engineering / Project Management @ 15% | | | $ 275,700 | | |
| Contingency @ 25% | | | $ 459,500 | | Remaining Items Cost |
| Total | Completed | $670,000 | $ 3,243,200 | | $2,573,200 |